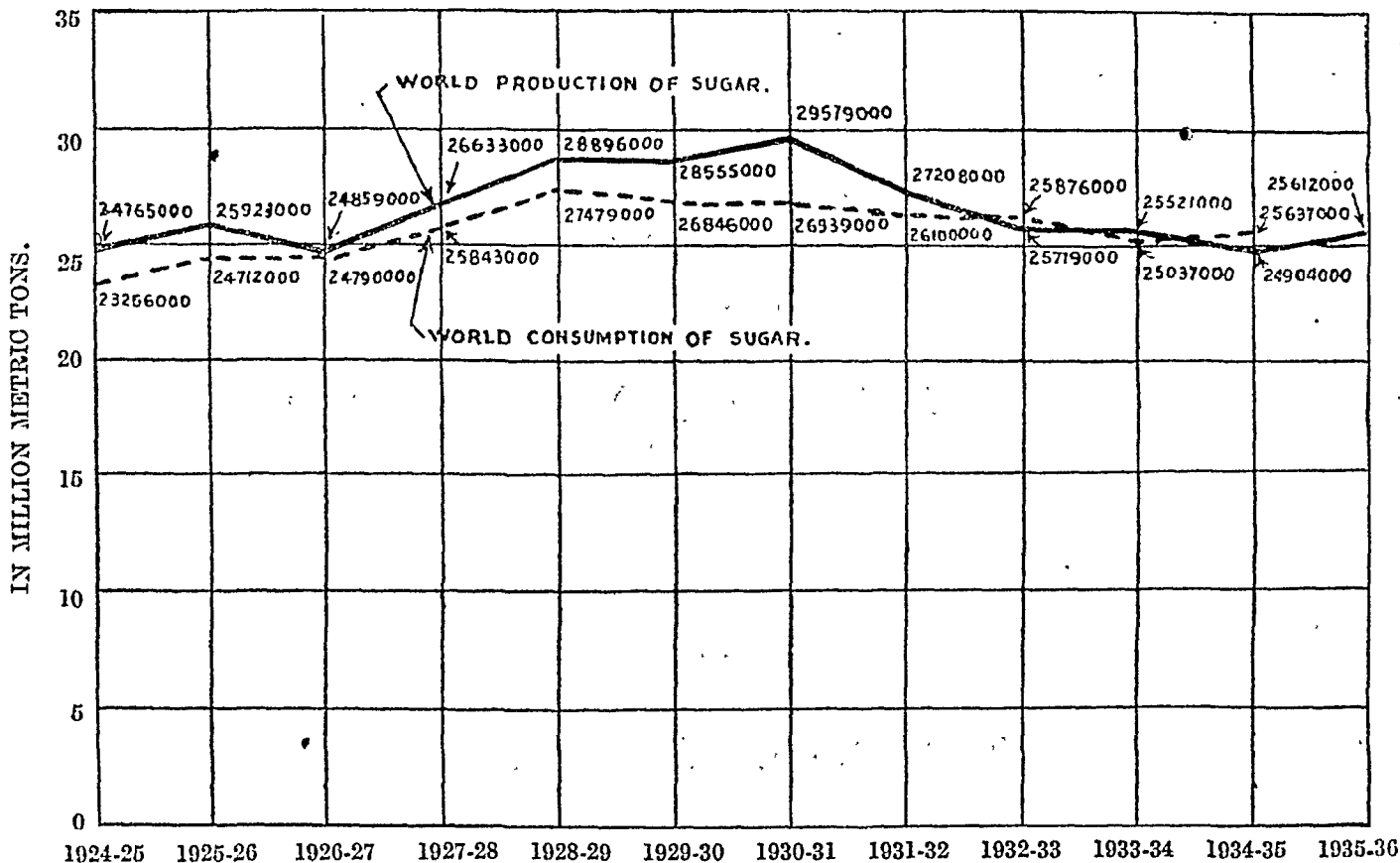


SUPPLEMENT TO THE " INDIAN TRADE JOURNAL ", MAY, 21, 1936.

---

**REVIEW**  
OF THE  
**SUGAR INDUSTRY OF INDIA**  
DURING  
THE OFFICIAL YEAR  
1934-35

GRAPH A.—SHOWING WORLD PRODUCTION AND CONSUMPTION OF SUGAR (CANE AND BEET)  
FROM 1924-25 TO 1935-36.



## REVIEW OF THE SUGAR INDUSTRY OF INDIA DURING THE OFFICIAL YEAR 1934-35

BY

R. C. SRIVASTAVA,

*Sugar Technologist, Imperial Council of Agricultural Research, India, Cawnpore.*

### I.—INTRODUCTION.

THE present issue of the Review embodies one or two new features, to which attention may be drawn at the outset. In view of the rapid expansion of the Sugar Industry in India, the scope of this Review was enlarged with the issue for 1930-31. Instead of confining itself only to sugar trade statistics and a record of price fluctuations, a brief survey of development on the agricultural, manufacturing, technical and scientific sides of the industry was also incorporated from that year. The "Technical and Scientific" section, dealing with work of a similar nature done in India, has now been renamed "Survey of Technical and Agricultural Work in India".

A change has also been made in the statistics for imports and consumption of sugar in India, by taking into account the imports into the Kathiawar ports. Details will be found in the Section on "All-India Sugar Trade".

This Review, as usual, deals with the Sugar Trade in India for the official year 1934-35 but it includes sugar production from cane in modern factories for the complete season 1934-35 which ends comparatively late in the year in some provinces together with the estimated quantity of sugar refined from gur for the calendar year 1935. Sugar Production Forecasts and reports have appeared in the *Indian Trade Journal* as follows:—

#### *Sugar Production Forecasts (All-India).*

1. First Memorandum on the Production of Sugar directly from Cane in Modern Factories in India during the season 1934-35—published in the *Indian Trade Journal*, dated 21st February, 1935.
2. Final Memorandum on the Production of Sugar directly from Cane in Modern Factories in India during the season 1934-35—published in the *Indian Trade Journal*, dated 25th April, 1935.
3. First Memorandum on the Production of Sugar directly from Cane in Modern Factories in India during the season 1935-36—published in the *Indian Trade Journal*, dated 6th February, 1936.

#### *Note on the Production of Sugar.*

4. Note on the Production of Sugar directly from Cane in Modern Factories in India during the season 1934-35—published in the *Indian Trade Journal*, dated 24th October, 1935.

The most important developments affecting the world sugar market in 1934 were perhaps the measures adopted by the United States Government for reducing the tariff rates and regulating by means of quotas the amount of sugar produced for consumption in that country. The quota system has had the effect of curtailing the production of sugar in countries catering for the American market and this was mainly responsible for the reduction of world cane sugar production during the year 1934-35 as compared with the previous year, although this reduction has been partly discounted by an appreciable increase in beet sugar production in Europe. Graph A shows the world production and consumption of sugar from 1924-25 to 1935-36. The graph has been prepared on the basis of figures published by Dr. Gustav Mikusch.

Throughout 1934-35 world prices continued low, being influenced by surplus stocks. Prices in American markets showed some improvement for a period, but it was only Cuban sugar that principally benefited and the rise was not reciprocated in the London market where prices remained depressed.

The sugar industry in Java has suffered very seriously due to the collapse of sugar values and the shrinkage of sugar markets. She was left with large stocks still on hand at a time when other exporting countries had almost eliminated their excess supplies. But there are now some grounds for optimism in the gradual reduction of stocks in Java as a result of the steps taken by the sugar producers of that country with the help of the Government for restricting sugarcane cultivation.

In the beginning of April, 1934, the first cost quotation of Java White Sugar was 4.10 guilders per 100 kilos. The price steadily declined and reached the minimum of the year 3.00 guilders by the middle of November. Thereafter the price slightly improved and stood at 3.50 guilders at the end of March, 1935. The following table shows the first cost quotations for superior Java White Sugar for west coast ports of India and the Rupee/Guilder exchange rate.

TABLE I.—*First Cost Quotations for Superior Java White Sugar and Rupee/Guilder Exchange Rate (for West Coast Ports of India).*

Date.	First Cost Quotation of Java Sugar.	Exchange Rate.	Equivalent in Rupees per Maund.
	(Guilders per 100 kilos.)	(Guilders per Rs. 100.)	Rs. A. P.
3-4-34 . . .	4.10	56½	2 11 2
17-4-34 . . .	4.00	56½	2 10 3
1-5-34 . . .	4.00	56	2 10 7
29-5-34 . . .	3.70	55½	2 7 8
19-6-34 . . .	3.60	55½	2 6 11
9-7-34 . . .	3.60	55½	2 6 9
24-7-34 . . .	3.60	55½	2 6 7
14-8-34 . . .	3.65	55½	2 7 4
28-8-34 . . .	3.60	55½	2 6 11
10-9-34 . . .	3.55	54½	2 7 0
25-9-34 . . .	3.40	54	2 5 6
9-10-34 . . .	3.40	53½	2 5 10
23-10-34 . . .	3.40	54½	2 5 5
30-10-34 . . .	3.20	54½	2 2 10
13-11-34 . . .	3.00	55	2 0 6
27-11-34 . . .	3.15	54½	2 2 3
11-12-34 . . .	3.15	54½	2 2 5
18-12-34 . . .	3.05	54½	2 1 6
1-1-35 . . .	3.05	54½	2 1 6
22-1-35 . . .	3.20	53½	2 3 5
19-2-35 . . .	3.50	53½	2 6 11
12-3-35 . . .	3.50	52	2 8 2
18-3-35 . . .	3.50	52	2 8 2
26-3-35 . . .	3.50	52½	2 7 4

The Indian market was less responsive to the conditions prevailing in the world markets, the home industry being sheltered against competition by a protective tariff. Indian requirements are, however,

not yet entirely met from home production and the imports of sugar into British Indian ports during 1934-35 amounted to nearly 223,000 tons as against 261,000 tons in the preceding year. Since the grant of protection to the Indian industry, it has developed its production steadily. 130 cane factories operated during the season 1934-35 with a production of sugar of 578,115 tons as against 453,965 tons in the preceding year.

The agricultural condition of the sugarcane crop during the year under review was not very favourable. The cane crop throughout the area covered by the districts of Meerut and Muzaffarnagar in the United Provinces and the major portion of the Punjab was badly damaged due to the adverse climatic conditions and an attack of *Pyrilla* and other insect pests. A detailed report on the damage to the cane crop has been incorporated in later sections of this review.

## II.—AGRICULTURAL.

### Area under Cane and Yield in terms of Gur.

According to the Final General Memorandum on the Sugarcane crop for 1934-35, the area planted with sugarcane is estimated at 3,471,000 acres as against 3,308,000 acres last year. The total yield of raw sugar (*gur*) is estimated at 5,085,000 tons, showing an increase of 4 per cent over last year's yield of 4,872,000 tons.

The following table shows the area (in acres) and yield (in tons) of raw sugar (*gur*) arranged by Provinces and States for the last two years and the average of the preceding five years and also the increase or decrease in the current year over the previous year and the average of the preceding five years:—

TABLE II.—*Area under Cane and Yield of Raw Sugar.*

Provinces and States.	AREA (IN ACRES).			INCREASE (+) OR DECREASE (—) IN THE CURRENT YEAR OVER	
	Current Year (1934-35).	Previous Year (1933-34).	Average of preceding Five Years.	Previous Year (1933-34).	Average of preceding Five Years.
				Per cent.	Per cent.
United Provinces (including Rampur State)	1,839,000	1,734,000	1,522,000	+6.1	+20.8
Punjab . . . . .	462,000	466,000	433,100	—0.9	+6.7
Bihar and Orissa . . . . .	445,000	418,000	287,000	+6.5	+55.1
Bengal . . . . .	276,000	257,000	212,000	+7.4	+30.2
Madras . . . . .	122,000	120,000	108,000	+1.7	+13.0
Bombay (including Sind and Indian States)	112,000	103,000	96,000	+8.7	+16.7
North-West Frontier Province . . . . .	43,000	49,000	49,000	—12.2	—12.2
Assam . . . . .	33,000	35,000	33,000	—5.7	..
Central Provinces and Berar . . . . .	28,000	20,000	23,000	—3.4	+21.7
Delhi . . . . .	8,000	3,000	4,000	+166.7	+100.0
Mysore . . . . .	45,000	42,000	39,000	+7.1	+15.4
Hyderabad . . . . .	51,000	46,000	(a) 36,000	+10.9	+41.7
Baroda . . . . .	2,000	2,000	2,000	..	..
Bhopal (Central India) . . . . .	5,000	4,000	(b)	+25.0	..
TOTAL . . . . .	3,471,000	3,308,000	(c) 2,844,000	+4.9	(c) +21.9

(a) Four years' average.

(b) Not available.

(c) Excluding Bhopal.



TABLE II.—Area under Cane and Yield of Raw Sugar—contd.

Provinces and States.	YIELD (IN TONS) EXPRESSED AS RAW SUGAR (Gur).			INCREASE (+) OR DECREASE (—) IN THE CURRENT YEAR OVER	
	Current Year (1934-35).	Previous Year (1933-34).	Average of preceding Five Years.	Previous Year (1933-34).	Average of preceding Five Years.
				Per cent.	Per cent.
United Provinces (including Rampur State)	2,758,000	2,570,000	1,793,000	+7.3	+53.8
Punjab	316,000	364,000	321,000	—13.2	—1.6
Bihar and Orissa	673,000	623,000	309,000	+8.0	+117.8
Bengal	492,000	457,000	282,000	+7.7	+74.8
Madras	321,000	325,000	301,000	—1.2	+6.8
Bombay (including Sind and Indian States)	258,000	270,000	257,000	—4.4	+0.4
North-West Frontier Province	43,000	54,000	50,000	—20.4	—27.1
Assam	32,000	40,000	33,000	—20.0	—3.4
Central Provinces and Berar	46,000	48,000	37,000	—4.2	+24.4
Delhi	5,000	1,000	3,000	+400.0	+66.7
Mysore	41,000	41,000	39,000	..	+5.1
Hyderabad	93,000	72,000	(a) 57,000	+29.2	+63.2
Baroda	3,000	3,000	3,000	..	..
Bhopal (Central India)	4,000	4,000	(b)	..	..
TOTAL	5,085,000	4,872,000	(c) 3,494,000	+4.4	(c) +45.4

(a) Four years' average.

(b) Not available.

(c) Excluding Bhopal.

In addition to the area for which particulars are given above, the crop is grown on a small scale in certain other tracts\* in India, the average area of which for the last five years has been 125,000 acres with an estimated production of 183,000 tons.

The comparative importance of the various provinces from the point of view of cane cultivation is shown by the following table which gives the area under cane and yield of raw sugar (average for the five years ending 1933-34) of each province or State as a percentage of the total area and yield for India :—

TABLE III.—Area under Cane and Yield of Raw Sugar (Average).

Provinces and States.	Average Percentage Area during the five years ending 1933-34.	Average Percentage of Gur during the five years ending 1933-34.
United Provinces (including Rampur State).	51.2	48.7
Punjab	14.6	8.7
Bihar and Orissa	9.7	8.4
Bengal	7.1	7.7
Madras	3.6	8.2
Bombay (including Sind and Indian States).	3.2	7.0
North-West Frontier Province	1.6	1.6
Assam	1.1	0.9
Central Provinces and Berar	0.8	1.0
Delhi	0.1	0.08
Mysore	1.3	1.1
Hyderabad	(a) 1.2	(a) 1.5
Baroda	0.07	0.08
Bhopal (Central India)	(b)	(b)

(a) Four years' average. (b) Not available.

**Condition of Sugarcane Crop during 1934-35.**

In the United Provinces excessive rains combined in the early part of the season and their premature

cessation caused some damage to the crop in certain tracts. The cane crop in the western districts of the United Provinces throughout the area covered by the districts of Meerut and Muzaffarnagar and the major portion of the Punjab province was badly damaged during 1934-35 as a result of the following causes :—

(a) The rainfall was unevenly distributed in this area in 1934. There was continuous rainfall from the end of June to the beginning of September. There were relatively few days of sunshine as a result of which the formation of sugar in the plant was hindered.

(b) The rains stopped in the first week of September, 1934, and there was almost complete drought up to the middle of December. This would have helped the cane to mature and to increase its sugar content, but the plant was attacked by *Pyrilla* and white-fly as soon as the rains stopped. These insects damaged the cane leaves and therefore the cane plant was unable to take advantage of sunshine for the synthesis of sugar.

(c) When the rains stopped, the cultivator fearing that the crop must be damaged by drought, resorted to heavy irrigation. This permitted the cane to grow, but prevented the thickening of the juice. As a combined result of the attack of *Pyrilla* followed by excessive irrigation, the juice of the cane was deficient in sugar and of low density. Both these factors were detrimental to sugar making.

\* Burma, Ajmer-Merwara, Gwalior, Kashmir, Central India, Rajputana, Benares State, Punjab States and Madras States.

(d) In course of time if weather conditions had continued normal the cane would have recovered to a certain extent but the crop was damaged by frost about the middle of January. The cane which was already sickly, received a severe set-back from the frost and in some area it became unfit even for the manufacture of *gur*.

The adverse climatic conditions combined with the attack of *Pyrilla* and other insect pests naturally affected the working of the sugar factories in this area. The average quality of *gur* was reported to be inferior this year. In the Punjab the rainfall in July and August was beneficial to the crop, but in September proved deficient. The dry weather during October, November and the first half of December affected the crop adversely. The crop was damaged in parts of the province by insect pests, particularly Top-borer and *Pyrilla* and also by frost. The yield was expected to be below normal. Weather conditions in Bihar and Orissa were generally favourable; and the condition figure for the crop, according to the district returns, was estimated at 92 per cent of the normal, against the past ten years' average of 95 per cent. The season in Bengal was, on the whole, favourable, and a satisfactory outturn was expected for the province. The total quantity of *gur* or raw sugar from date-palm juice and other sources was estimated at 100,000 tons, practically the same as in last year. The yield in Madras was estimated to be below normal. The seasonal factor for the Presidency worked out at 91 per cent of the average, as against 95 per cent last year. In the Bombay Presidency the increase in area was attributed mainly to extension of cultivation of the crop by sugar factories in the Deccan canals area. In Gujrat, the crop was reported to have fared well on the whole. In the Deccan, the crop progressed well but as a result of the prolonged and severe cold spell about the middle of January serious damage was caused to the crop. In the Karnatak, the crop fared well in the west; but suffered badly in the east due to prolonged drought in the middle of the season, and although the rainfall at the end of October and in the first week of November improved the crop to a certain extent, its yield was estimated to be much below normal. In the Konkan, the crop did fairly well on the whole. In Sind, the crop suffered to some extent from frost which occurred in the third week of January. This year also there was a decrease in area in the North-West Frontier Province, mainly in the Peshawar district, which was due to the low prices of *gur*. The yield was estimated to be about 95 per cent of the normal. Weather conditions in Assam were not quite favourable for the crop as flood, drought and insects caused some damage in all districts except in Lakhimpur and the Sadiya Frontier Tract. The season in the Central Provinces was, on the whole, favourable, although the crop suffered slightly from excessive early rains in three districts.

### Estimated Production of Sugarcane (in Tons).

The following table shows the area under sugarcane, the yield of raw sugar (*gur*) and the calculated production of sugarcane in India from 1925-26 to 1934-35. The assumptions on which the figures are based have been stated in the Review\* for 1932-33.

TABLE IV.—Area under Sugarcane, Yield of Raw Sugar (*Gur*) and Estimated Production of Sugarcane in India.

Year.	Area under Sugarcane.	Gross Production expressed as <i>Gur</i> .	Calculated Production of Sugarcane (10 and 11 factors).
	Acres.	Tons.	Tons.
1925-26 . . .	2,806,000	3,143,000	34,382,000
1926-27 . . .	3,075,000	3,420,000	37,392,000
1927-28 . . .	3,105,000	3,376,000	36,842,000
1928-29 . . .	2,650,000	2,827,000	30,669,000
1929-30 . . .	2,677,000	2,885,000	30,961,000
1930-31 . . .	2,902,000	3,359,000	35,780,000
1931-32 . . .	3,076,000	4,116,000	43,316,000
1932-33 . . .	3,435,000	4,859,000	51,129,000
1933-34 . . .	3,433,000	5,055,000	52,455,000
1934-35 . . .	3,596,000	5,268,000	54,346,000

It will be seen from the above table that there is an increase of 4.7 per cent over last year in the total sugarcane acreage, of 4.2 per cent in the total yield; and of 3.6 per cent in the calculated production of sugarcane.

### Improved Varieties of Sugarcane.

The cultivation of improved varieties of sugarcane continues to increase steadily. The following table shows the area under such varieties in the various provinces of India (including Burma) during 1934-35 as compared with the preceding year:—

TABLE V.—Area under Improved Varieties of Cane in Different Provinces.

Provinces.	1934-35.	1933-34.
	Acres.	Acres.
United Provinces . . .	1,560,000	1,445,478
Punjab . . . . .	201,873	173,061
Bihar and Orissa . . .	400,600	361,300
Bengal . . . . .	130,838	175,415
Madras . . . . .	61,605	58,749
Bombay . . . . .	16,373	9,872
North-West Frontier Province.	38,144	43,000
Assam . . . . .	8,186	9,089
Central Provinces . . .	15,490	14,503
Burma . . . . .	12,610	4,190
TOTAL . . . . .	2,445,719	2,295,257

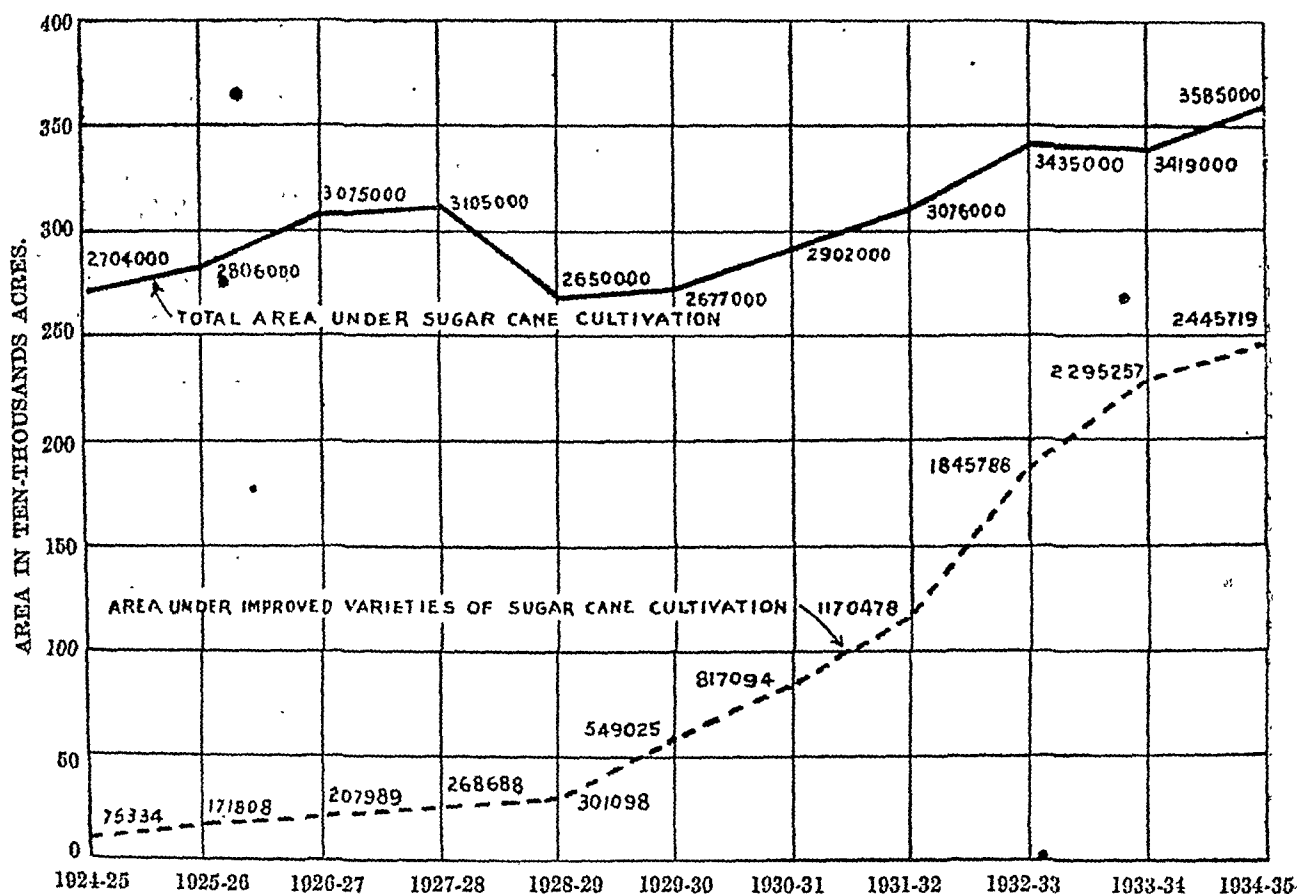
It will be seen that the area under improved varieties in the provinces of India amounted to 67

\* Published as a Supplement to the *Indian Trade Journal*, dated the 5th July, 1934.

per cent of the total area during the year under review as against 62 per cent during the previous year.

Graph B shows the total area under sugarcane in India and the area under improved varieties for the last twelve years from 1924-25 to 1934-35.

GRAPH B.—SHOWING THE TOTAL AREA UNDER SUGARCANE AND THE AREA UNDER IMPROVED VARIETIES IN INDIA FROM 1924-25 TO 1934-35.



### III.—MANUFACTURING.

One hundred and twelve factories making sugar direct from cane are reported to have worked during the season 1933-34 as against fifty-seven factories in the previous season, while sixteen factories refined *gur* during 1934 compared with twenty-seven factories during the previous year. The year 1934 was unfavourable for the *Gur*-refining Industry as *gur* prices were higher and sugar prices were lower than in the previous year.

The production of sugar direct from cane in India totalled 453,965 tons during the season 1933-34 as against 290,177 tons during 1932-33, while the total quantity of sugar refined from *gur* decreased from 80,106 tons in 1933 to 61,094 tons during 1934. Thus the total production of modern factory-made

sugar in India in the combined cane and *gur* season amounted to 515,059 tons in 1933-34 compared with 370,283 tons in 1932-33.

Nineteen new sugar factories were built for working in 1934-35, making a total of one hundred and forty-two cane factories in India. One hundred and thirty of these 142 factories are reported to have worked during the season 1934-35 as 6 factories were not ready for working in time, 3 failed to submit returns, 2 did not work owing to financial difficulties and 1 has been excluded as it is a small experimental factory for training of students, with a nominal and uncertain output. The production of sugar direct from cane in India totalled 578,115 tons during the season 1934-35 as against 453,965 tons during

1933-34. The increase in the output of sugar during the season 1934-35 over that of the previous season was thus 124,150 tons.

The progress which the sugar industry in India is making on its technical side is shown by an analysis of the average percentage recovery of sugar from

cane for factories in different provinces of India during the season 1934-35 compared with that of the previous year. A table is given below showing the average percentage of sugar directly from cane during the season 1934-35 compared with that of the previous season.

TABLE VI.—Average Percentage Recovery of Sugar from Cane during Season 1934-35.

Particulars.	AVERAGE PERCENTAGE RECOVERY FROM CANE.							
	1934-35.				1933-34.			
	United Provinces.	Bihar and Orissa.	All other Provinces.	All-India.	United Provinces.	Bihar and Orissa.	All other Provinces.	All-India.
Maximum	10.44	9.74	11.10	11.10	10.27	10.00	10.98	10.98
Minimum	5.45	6.93	5.00	5.00	6.60	5.50	4.38	4.38
Mean	8.56	8.70	8.77	8.66	9.08	8.32	8.75	8.80

The highest recovery for the season was 11.10 per cent as against 10.98 per cent during the preceding season. The average extraction for the whole of India shows a slight decline, the figure being 8.66 for 1934-35 as against 8.80 for 1933-34. The average extraction percentage in factories in Bihar and Orissa which had dropped to 8.32 in the previous season as a result of the earthquake recovered to 8.79 this year, which is not far from the average for this province. In the United Provinces the recovery has declined from 9.08 per cent in 1933-34 to 8.56 per cent in 1934-35 due to the cane crop having been damaged in two western districts. It is gratifying to note that the highest recovery obtained during the season exceeded 11 per cent. As in the previous year, as many as 9 factories in India had recoveries of 10 per cent and over. Out of 130 factories 45 had recoveries of 9 per cent and over and 92 had recoveries of 8 per cent and over. In Southern India especially in Bombay, the majority of factories had recoveries of over 10 per cent. In the United Provinces the factories situated in the Eastern districts did fairly well as they had the advantage of a more or less normal crop. The working results of factories in Bihar and Orissa were on the whole satisfactory.

Graph C\* shows the total production of sugar including sugar produced by indigenous process and the production of sugar direct from cane as well also that of sugar refined from *gur* from 1920-21 to 1934-35.

The following table shows the production of sugar direct from cane and from *gur* as well as the number

of factories producing sugar direct from cane and of those refining *gur* :—

TABLE VII.—Production of Sugar from Cane and *Gur* together with the Number of Factories and Refineries.

Year.	Production of Sugar direct from Cane.	Number of Factories that produced Sugar direct from Cane.	Production of Sugar refined from <i>Gur</i> .	Number of Factories that refined <i>Gur</i> or Raw Sugar.
	Tons.		Tons.	
1926-27	62,941	25	58,085	22
1927-28	67,684	26	52,055	10
1928-29	68,050	24	31,038	14
1929-30	89,768	27	21,150	11
1930-31	110,859	29	31,791	10
1931-32	158,581	32	69,539	17
1932-33	290,177	57	80,106	27
1933-34	453,965	112	61,094	16
1934-35	578,115	130	40,000*	12*

\* Estimated.

It will be observed from the above table that the production of sugar direct from cane as well as the number of sugar factories working with cane have been steadily increasing. The increase of the former in the year 1934-35 over the previous year amounted to about 30 per cent while that of the latter to about 16 per cent.

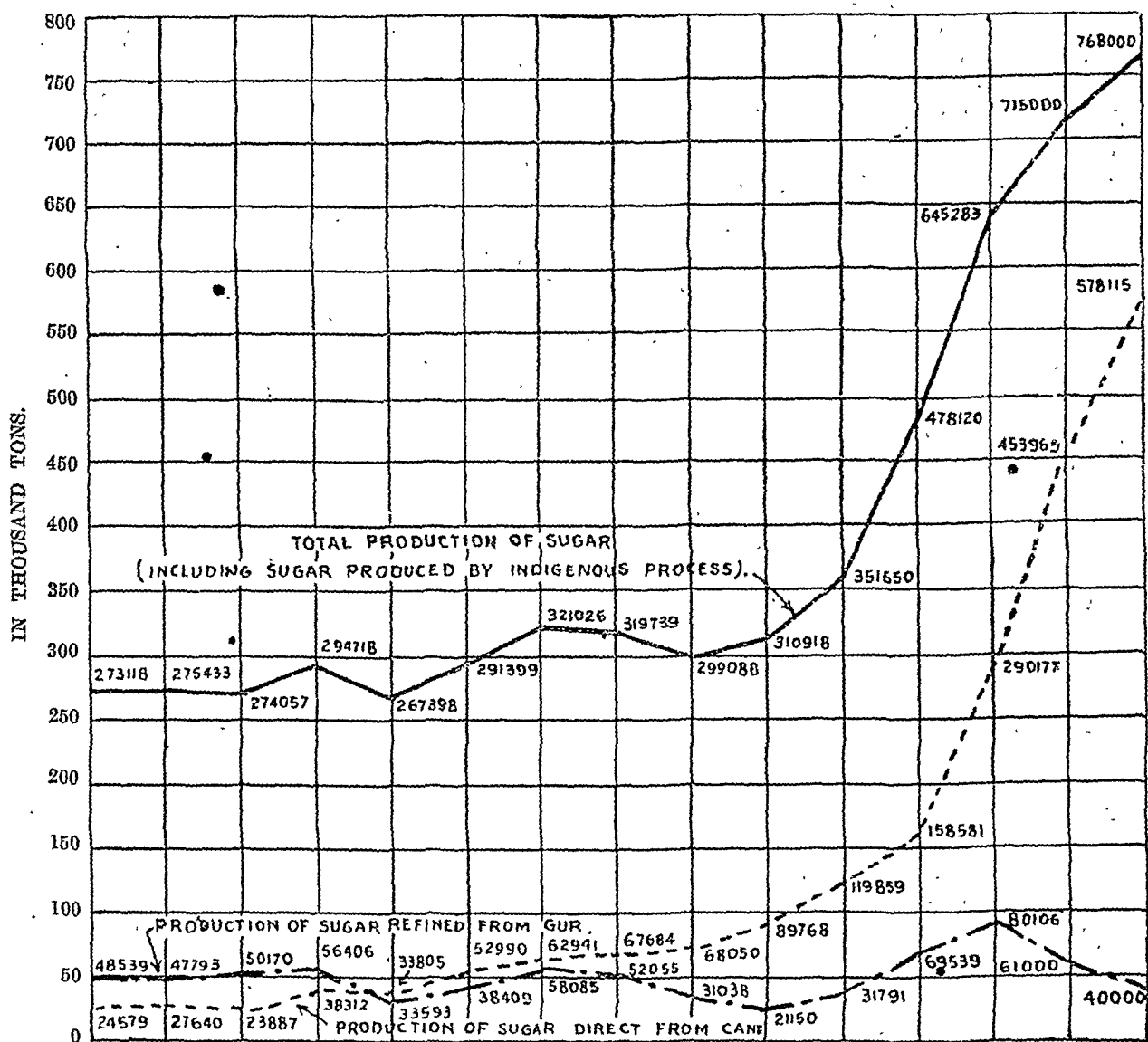
The production of white sugar by indigenous methods is estimated at 150,000 tons in 1934-35 as against 200,000 tons in 1933-34.

The following two lists of sugar factories in India are given in the Appendix to this Review.

List A.—Modern Sugar Factories and Refineries existing in India in 1934-35.

List B.—New Factories constructed for working during 1935-36.

GRAPH C.—SHOWING PRODUCTION OF SUGAR IN INDIA FROM 1920-21 TO 1934-35.



1920-21 1921-22 1922-23 1923-24 1924-25 1925-26 1926-27 1927-28 1928-29 1929-30 1930-31 1931-32 1932-33 1933-34 1934-35

## IV.—SURVEY OF TECHNICAL AND AGRICULTURAL WORK IN INDIA.

## (1) Imperial Sugarcane Station, Coimbatore.

## (a) Sugarcane Breeding of Sub-tropical Types and Thick Canes.

In addition to the production of useful types of sugarcane, the Imperial Sugarcane Station at Coimbatore continued its work on cane-breeding technique generally. As regards controlling the time of arrowing, it was observed that the planting of canes at different seasons and under different soil conditions synchronised their times of arrowing to such an extent as to enable effecting of crosses not possible hitherto. Canes of Co. 290 were subjected to six

hours day-light. These flowered twenty-six days earlier than the controls. The pollen, however, gave only one per cent germination when cultured artificially. A modified form of topping concentrating on the side shoots was started with the object of further influencing the time of arrowing. Canes of P.O.J. 2878 were "topped" twice and these flowered eleven days later than the controls. This enabled crossing on a bulk scale with Co. 290 to be undertaken. The germination of the seeds was satisfactory. Certain of the hybrids between P.O.J. 2725 and various types of *S. spontaneum* showed distinct promise as parents on account of their health and good tillering power. These hybrids, which showed little healthy pollen in the first year,

are now reported to be producing a fair amount of such pollen and to be setting seed freely. Certain of the hardier medium Coimbatore canes were further utilized as parents. These were:—Co. 205, Co. 243, Co. 211, Co. 245 and Co. 290. The following crosses were made on a large scale:—Vellai  $\times$  Co. 243; P.O.J. 2725  $\times$  Co. 243; P.O.J. 2778  $\times$  Co. 290. Other combinations which are expected to yield good seedlings were Co. 419  $\times$  Co. 241 and Co. 411  $\times$  Co. 243.

Other studies during the year 1933-34 included (i) Isolation of arrowing canes, (ii) Effect of arrowing on juice quality, (iii) Characteristics of certain thick cane seedlings, (iv) Morphological and cytological studies of canes and (v) Pollen studies. Experiments on germination confirmed the previous finding that in a three budded sett, the central one germinates the quickest and the best. Experiments on germination in thick cane seeds were continued. This consisted of the comparison of Vellai with two of its seedlings, viz., Co. 409 and Co. 403, for seed germination when the same pollinating parent was employed. The male parents used were E.K. 28 and Co. 205. It was observed that the largest number of germinations were obtained when Co. 409 was employed as the ovule parent.

#### (b) Sugarcane-Sorghum Hybrids.

Crosses between Sugarcane and Sorghum yielded a certain number of selections some of which were characterized by high sucrose and purity percentages. The combinations with Coimbatore canes gave, on the whole, better types than that with P.O.J. 2725. The  $F_1$  hybrids between P.O.J. 2725 and Sorghum Durra (Stapf) crosses with the sorghum male parent yielded a rather interesting series. Co. 356 is reported to have shown promise in more than one North Indian station. It is reported that some of these hybrids, though not fit for milling in six or seven months as at Coimbatore, are expected to be the earliest to mature during the ripening period for cane in some of the areas in sub-tropical India. In tropical India the most extensive tests with these hybrids were those carried out in the Madras Presidency. It was found from one year's results that certain of them attained a purity of 85 and over in about 200 to 220 days from the time of planting and improved in quality for nearly 100 days afterwards. The juices of Sorghum hybrids at the point of their maximum efficiency are reported to be richer than those of other Coimbatore canes.

#### (c) Performance of Coimbatore Canes in Sub-tropical and Tropical India and in Foreign Countries.

Co. 225 is reported to be working its way into the Kangra district of the Himalayas and at altitudes of over 4,000 feet above sea-level. Some of the poorly bred canes are reported to attract attention

in most farms in North and South India. These are Co. 361 in the North-West Frontier Province, Co. 408 in Karnal (Punjab), Co. 413 at Shahjahanpur (United Provinces), Co. 361 and Co. 407 at Jorhat (Assam), and Co. 360 and Co. 402 at Pabna (Bombay Presidency). Co. 213, Co. 281 and Co. 290 continued to be popular over wide areas. Co. 243 and Co. 313 are new medium canes showing promise in the Anakapalle tract of the Madras Presidency while Co. 290 is reported to have found a definite place in parts of the Bombay Presidency under comparatively adverse conditions of soil and irrigation. Co. 281 and Co. 290 followed by Co. 213 are reported to be proving useful in foreign countries like Argentina, Louisiana, South Africa and Australia. The former two would appear to have revealed unsuspected resources of both drought and disease resistance, out-rivalling a cane of even such outstanding merit as Uba.

#### (d) The Karnal Sub-station.

Two years' experience in growing seedlings at Karnal in different ways and planting them in the ground at different times of the year gave definite indications as to the most effective manner in which to carry on the programme of work laid down for this sub-station. The results of periodic shoot and root studies were not so striking owing to the absence of a pronounced summer during 1933-34. Periodic hand-refractometer readings for estimating juice quality, which were started in August, 1933, and continued till February, 1934, gave useful information not only on the time of maturity of the different types but also the period during which the different canes maintain their juice quality without serious deterioration; the latter is an important character in cane cultivation, whether the end product is to be *gur*, *rab* or white sugar. Work on the selection of cane varieties continued at the station.

#### (2) Imperial Institute of Agricultural Research, Pusa.

##### Varietal, Manurial and Cultural Experiments on Sugarcane.

Varietal experiments on sugarcane at Pusa were continued during the year 1933-34. A number of varieties imported from Coimbatore during the years 1931 to 1934 were under multiplication in the nursery. Co. 213 and Co. 216 are reported to be still the best all-round canes both for the millers and the growers. Co. 290 was tested in a mill trial against Co. 214 and Co. 213. Co. 211 which has been considered the standard early ripening cane gave a poor tonnage. Trial conducted in the agricultural section proved that Co. 290 was an early ripener, the tonnage yield and *intercane* distance planted to its being superior to Co. 214. The results of the mill trial also showed that a saving

in the cost of the raw material could be effected by the substitution of Co. 299 for Co. 214. Tonnage yield trials with Cos. 210, 213 and 331 showed that Co. 331 was the heaviest yielder while there was not much difference in the yields of Co. 210 and Co. 213.

Manurial experiments with rapeseed and superphosphate on Co. 213 were laid out with six replications for each treatment. The manures were applied at the time of planting and the amount of phosphoric acid in rapeseed was deducted from the main dressing of superphosphate. The results showed that the yields were almost similar for 50 lbs.  $P_2O_5$ +40 lbs. N., 75 lbs.  $P_2O_5$ +40 lbs. N., and 100 lbs.  $P_2O_5$ +40 lbs. N.; all giving higher yields than no manure. Manurial and rotation experiments with Co. 210 were also conducted. The object of this experiment was to maintain the land in the best possible condition for a close cane rotation such as cane—fallow—cane. The treatments were carried out with ten replications for each. The experimental area was under cane during 1931-32. The treatments per acre were—(1) Fallow in *kharif* and 14 tons farm yard manure applied at the end of the monsoon, (2) Fallow in *kharif* and complete minerals (40 lbs. N. as ammonium sulphate, 50 lbs.  $P_2O_5$  as superphosphate and 40 lbs.  $K_2O$  as potassium sulphate) applied at the time of planting, (3) *Sann* hemp sown in *kharif* and ploughed in after eight weeks with 50 lbs.  $P_2O_5$  as superphosphate, 50 lbs. N. as rapeseed applied at the time of planting, (4) *Sann* hemp sown in *kharif* and ploughed in after eight weeks. Complete minerals (as in treatment No. 2) applied at the time of planting, and (5) Fallow in *kharif* and standard manure (40 lbs. N. as rapeseed and 50 lbs.  $P_2O_5$  as superphosphate) applied at the time of planting. The results showed that the treatment No. 1 gave the highest yield followed by treatment Nos. 3 and 2, while treatment Nos. 4 and 5 gave almost similar results to treatment No. 2. Experiments with organic and inorganic fertilizers on Co. 210 were laid out with six replications for each treatment. The different kinds of manures applied per acre were:—(1) No manure, (2) 10 tons farm yard manure applied at the end of monsoon, (3) 20 tons farm yard manure at the end of monsoon, (4) Green manure (*Sann* hemp) in *kharif* and complete minerals (40 lbs. N. as Amm. sulphate, 40 lbs.  $K_2O$  as potassium sulphate and 50 lbs.  $P_2O_5$  as superphosphate) applied at the time of planting, (5) Complete minerals (as in treatment No. 3) applied at the time of planting, and (6) Green manure (*Sann* hemp) in *kharif* with 50 lbs.  $P_2O_5$  as superphosphate. The experiments showed that the dressing of 20 tons farm yard manure per acre turned out to be the best. This was also confirmed by similar experiments in another area and the results of these two sets of experiments indicated that farm yard manure (at the rate of 14 tons per acre) was the most suitable dressing for sugarcane. A preliminary experiment on the effect of farm yard

manure and silt on the tonnage yields of Cos. 210, 303, 313, and 331 was also carried out.

Spacing experiment with Co. 210 and interlocking experiments with lodging sugarcane varieties were also performed. During 1933-34 experiments on the trashing of early ripening canes for seed with Cos. 214, 299, 281, and 313 were continued and the damage caused by jackals and pigs to the standing crop was found to be less than in the previous year. In a germination study made on trashed and fresh canes under field conditions, it was found that percentage of germination was more in the case of trashed seed in all varieties except Co. 299, where fresh seed gave better results.

### (3) United Provinces.

#### (a) Cultural, Varietal and Manurial Experiments on Sugarcane.

In the United Provinces the area under improved varieties of sugarcane was 81 per cent of the total area during 1933-34 compared with 73 per cent during the preceding year. Cultural experiments indicated that with light soil and high manuring, planting in trenches at 4 feet or  $3\frac{1}{2}$  feet, and earthing up gave best results; in heavy soil of medium richness, planting at  $3\frac{1}{2}$  or 3 feet between the rows, with earthing up; and in poor soil at the same spacing without earthing up. In varietal trials, Co. 313 was the best yielder, closely followed by Co. 341 and Co. 350. The latter is, however, susceptible to mosaic. In terms of sugar, Co. 313 maintained its position, followed by Co. 350, but Co. 347 and Co. 349 are reported to be better than Co. 341. Cos. 213, 244 and 290 held the field in many areas, though Cos. 300 and 312 are reported to be gaining ground in the Eastern, Rohilkhand and Western circles.

Regarding manurial experiments it is reported that green manure with *sann* increased the yield by over 40 per cent; and could be profitably augmented by cow-dung or ammonium sulphate, but not by castor cake. Castor cake alone at 120 lbs. nitrogen to the acre, gave better results than equivalent mixtures of castor cake and ammonium sulphate; all being better than farm yard manure alone. Where green manuring could not be done, castor cake alone was indicated if cheap and readily available; and alternatively cow-dung supplemented by a later dose of ammonium sulphate. Quick acting chemical fertilizers gave the best results when applied either before planting, after germination, or after tillering, little difference having been found between these alternatives. If applied later, they do little good, as the plant absorbs most of its mineral requirements early in its growth, and is unable to utilise these after the critical period has passed. Experiments on the effect of organic matter and nitrogen on the ripening of cane showed that the richer the soil, the later the cane matures,



coincident with increased yield. Field-scale experiments in utilising molasses as manure for cane were continued. Its effect on cane cultivation when applied at the rate of six and twelve tons molasses to the acre was compared against artificials supplying the equivalent nitrogen, phosphorus and potash. While applications after planting depressed the yield, the indications were that this bye-product could be used with advantage provided it was applied before the sowing date. The effect of molasses upon the nitrogen content and fertility of different types of soils in pot cultures was also examined. The average results after two *rabi* and two *kharif* crops, and after fallow, indicated a definite increase in nitrogen where molasses had been added.

#### (b) Mosaic Disease of Sugarcane.

The effect of continued mosaic disease in a standard cane Co. 213 upon tonnage, juice and sugar content was studied. In 1933-34 the unaffected cane yielded 16 per cent higher than the diseased cane and gave 1.8 per cent more juice, but the difference in sucrose content, 0.02 per cent, was insignificant.

#### (4) Bihar and Orissa.

##### (a) Varietal and Manurial Experiments on Sugarcane.

During 1933-34 one hundred Coimbatore seedlings were under trial at the Sepaya farm. Forty varieties were rejected and the rest re-grouped for further trials. Co. 299, an early variety, was multiplied for distribution purposes. Co. 331 gave significantly better yield than either Co. 210 or Co. 213 and is reported to be a very good cane crop in a year of well distributed rainfall. In south Bihar Co. 285 on low water-logged lands continued to give a good account of itself. It is also reported to be a good cane for unirrigated conditions in this tract and at Gaya farm its outturn under unirrigated conditions was nearly 500 mds. per acre. At the Sabour farm Cos. 312, 342, 346 and 300 are reported to be promising types.

Manurial trials on sugarcane were carried out on almost all the departmental farms. In north Bihar a combination of 40 lbs. nitrogen with 50 lbs.  $P_2O_5$  is reported to be the best for sugarcane, while in Chota Nagpur 80 lbs. nitrogen alone gave heavy yields on the departmental farms. Anything more than 60 lbs. of nitrogen per acre is reported to be definitely uneconomical on the heavy soils of south Bihar.

##### (b) Experiments on the Open-pan System of Sugar Manufacture.

A one-ton cane crusher was successfully designed and manufactured during 1932-33 and further modifications were made in the smaller type of mill already designed. A new experimental mill was constructed and underwent trials. It could crush

15 mds. per hour of hard-rinded cane of the type of Co. 213 and required less than 8 B.H.P. to run it. Further investigations are proceeding on the single-pan method of making *Khandsari* sugar, evolved at Patna.

#### (5) Punjab.

##### (a) Varietal and Cultural Experiments on Sugarcane.

Coimbatore canes in the Punjab are estimated to yield about 50 per cent more than the *deshi* varieties. The following Coimbatore varieties are recommended by the Department of Agriculture, Punjab:—Co. 285, Co. 233, Co. 213, Co. 290, Co. 281 and Co. 205. In the Agricultural Farms a large number of varietal tests were carried out. The regular tests comprised—

- (a) Varieties maturing early in the season,
- (b) Varieties maturing in the middle of the season,
- (c) Varieties maturing late in the season,
- (d) Varieties suitable for *gur*-making only.

Six early-maturing varieties were tried. The experiment showed that *katha* which is supposed to be a very early cane actually ripened after Co. 281 and Co. 313 and at the same time yielded poorly. Co. 313 did the best. Amongst the five mid-season varieties tried Co. 213, the standard variety, did better than three others. Co. 347 did equally well and in addition ripened earlier than Co. 213. Of the four late-maturing varieties tried Co. 300 was the best and gave very high outturn. Co. 312 stood second; this is reported to be an excellent variety; it made fine quality crystalline *gur* and its sucrose percentage was also high. The only defect in this variety was its liability to lodge especially in heavily-manured fields. Results obtained by the experiment on sowing sugarcane in trenches and on flat were in favour of trench-sown crop and showed that the best distance from trench to trench for the thin and medium canes generally grown in the Punjab was two feet. As regards the ratooning of sugarcane Co. 213 did not prove to be a good ratooning cane but Co. 223, Co. 205 and Co. 285 have ratooned well for a number of years. An experiment on September planting of cane at the Gurdaspur showed that the September-planted canes gave increased yield of 75 per cent over those planted in March. Heavy yields were recorded and if future trials confirm these results, and the economics of September planting justify it, the practice will be advocated.

##### (b) Miscellaneous.

Experiments with molasses as manure gave unsatisfactory results, but it was profitable to use when the price was less than annas



## (6) Madras.

## (a) Cultural, Varietal and Manurial Experiments on Sugarcane.

In the Madras Presidency research work on sugarcane was continued on an intensive scale at the Anakapalle Research Station. Sugarcane were made at most stations with a view to studying the effect of planting in different months on the growth of the crop and the quality of juice. Sugarcane planted in the months of February-April and harvested the following year appeared to grow well and to give juice of superior quality. The crop planted after June responded poorly in every respect. The seven hybrids (sugarcane-sorghum crosses), Nos. Co. 351 to Co. 357, were 'short-cropped' at Anakapalle to study their behaviour on a field scale. Co. 351, Co. 352, Co. 353, Co. 355 and Co. 356 were found to be good yielders. Co. 351 was found to mature early with a high sucrose content. At Anakapalle it was found that sugarcane planted by the ordinary furrow method of planting gave a slightly higher yield than that planted in trenches, but the crop by the latter method analysed better while no perceptible difference was noticed in the extent of lodging. The experiments on increased seed rate showed that the yields were not increased by using a heavier seed rate. For a cane like M.A. 21, a seed rate higher than 12,000 setts per acre was not necessary. In the wrapping and propping experiments it was found that a slightly increased yield was obtained but the difference was so little that it was not commensurate with the heavy cost involved in wrapping and propping. A rotation experiment which had been in progress at Palur Agricultural Research Station for ten years was concluded and the results show that it is detrimental to grow sugarcane in alternate years and that it is economical to grow it once in three years, while good yields can be obtained in four years. In the trial of varieties tried in wet lands with a single irrigation at the time of planting gave an increase of 36 per cent in jaggery yield over the local red cane. In the trial of varieties under normal district conditions in Vizagapatam, P.O.J. 2878 gave the highest yield of 51.78 tons per acre. Co. 281 was the next with an yield of 46 tons of cane per acre. J. 247 continued to be very popular. Co. 213 passed the trial stage and came into favour replacing the local red cane. Co. 281, Co. 243, Co. 313 and P.O.J. 2878 were also found promising and were grown by ryots to suit different conditions. Fiji B practically ousted all other varieties in the South Arcot district owing to its high sucrose content. Co. 213 and Co. 290 are reported to be popular varieties in Coimbatore.

The manurial experiments at Samalkota showed that the application of ammonium sulphate by itself

or in combination with castor or groundnut cake was found to yield more than either castor or groundnut cake. At Palur it was found that ammonium sulphate was superior to sodium nitrate when used by itself or in combination with poonac. The best yields were obtained when potash and phosphates were added to 200 lbs. of nitrogen in the shape of cake and ammonium sulphate.

## (b) Mosaic Disease of Sugarcane.

In the varietal trials conducted to test the susceptibility of varieties to 'Mosaic', it was found that P.O.J. 2878 and Co. 335 were free from the disease throughout. Co. 213, Co. 360, Co. 361, B. 3412, E.K. 28, Poovan and Vellai were highly susceptible and Co. 402 and Co. 412 fairly resistant. An experiment designed to estimate the loss of tonnage due to mosaic in Co. 213 revealed a marked loss of 15 per cent in the weight of cane per acre.

## (7) Bengal.

## (a) Varietal Experiments on Sugarcane.

As a result of demonstrations the cultivation of Co. 213 sugarcane in Bengal was greatly popularized. The ryots are reported to be quite familiar with the high tonnage of cane and better yield of gur, both in quantity and quality of improved Co. 213 cane. The experiments conducted at the Government farms proved that Co. 213 can be grown in transplanted paddy land. Twelve cane varieties were grown in the Dacca farm for trial and multiplication. Four Coimbatore varieties were received from the Dacca Cane-seedling Testing Station for test. Seven varieties were rejected as being indifferent. Work on the sugarcane seedlings continued in the Sugarcane Seedlings Testing Station. Besides Co. 213 there were 97 varieties under trial. Out of these 8 varieties were found to be promising.

## (b) Experiments on Open-pan System of Sugar Manufacture.

The work on the improved crusher and furnace devised by the Agricultural Engineer, Bengal, was continued. A demonstration factory for the manufacture of sugar on the open-pan system was erected at Rajshahi and another similar factory at Malda. Improved aerators and grainers, sugar disintegrators and centrifugals were designed for use in open-pan factories. Further experiments on the manufacture of white sugar were also continued at the Dacca farm.

## (8) Burma.

## (a) Varietal, Manurial and Cultural Experiments on Sugarcane.

The sugarcane crop in Burma is receiving better chance of replacing rice on

any other crop. A fair yield of sugarcane is reported to be twelve tons per acre producing a gross return of Rs. 120 whereas the gross return on paddy is rarely more than Rs. 25. A survey carried out by the Pyinmana Central Farm showed that there were about 20,000 acres in the vicinity of Pyinmana on which sugarcane crop could be grown. The indigenous varieties of sugarcane were found to be of very mediocre value in tonnage and sucrose content and this station successfully introduced into Burma some of the Java seedlings, notably P.O.J. 2878 and P.O.J. 2727, which are already widely distributed and which in tonnage and sucrose far surpass the older varieties. Investigations indicated that the crushing season could be prolonged by suitable plantings of certain other varieties which are maintained on the farm. Fertilizer experiments were continued which indicated that under farm conditions the most profitable fertilizer was sulphate of ammonia which, from an application of 3 cwt. per acre, gave an increase in cane tonnage of 29 per cent with P.O.J. 2878. The combination of this fertilizer with potash and phosphate gave no significant increase of crop of sugar content. A modification of the somewhat expensive method of cane planting, in which small pits are dug by hand, was effected with some of the new and more vigorously growing cane which yielded in these experiments crops of 45 to 50 tons per acre.

#### (b) *Insect Pests of Sugarcane.*

The black beetle pest of sugarcane in Myitkyina district continued to be under observation. It was proved that serious damage by grubs took place when the cane was in the field for more than two years and that even in very badly infested fields cane could be grown without fear of damage when such fields were ploughed up, cleared and left fallow for a full season. Two other varieties of black beetles were in evidence in greater number than before. The grubs were kept under observation and proved to be a different beetle not injurious to cane either in the grub or adult stage. Other pests in evidence were borers. The weevil was also in evidence. The only possible means of control for it would be the burning of all affected ratoon stools when fields are ploughed up.

#### (9) *Assam.*

##### (a) *Varietal, Manurial and Cultural Experiments on Sugarcane.*

All the varieties introduced by the Jorhat farm in Assam gave increased outturns over the local cane *Teli* in regard to both stripped cane and sucrose. P.O.J. 2878 gave the highest yield of stripped cane and sucrose per acre, followed in order by P.O.J. 2714 and Co. 290. In the ratoon crops

P.O.J. 2714 gave the heaviest yields of stripped cane and sucrose per acre closely followed by Co. 290 and P.O.J. 2878.

The manurial experiments were re-designed and each treatment was replicated four times. On the ratoon crop of Co. 213, Ammophos at the rate of 600 lbs. per acre gave the highest increase of 21.23 per cent total sucrose per acre over the control followed by oil-cake at 2,000 lbs. per acre and oil-cake 1,000 lbs. plus Ammophos 300 lbs. per acre, the percentage increase being 19.86 and 15.07, respectively. The combination of superphosphates 300 lbs., oil-cake 1,000 lbs. and sodium nitrate 300 lbs. per acre gave the highest increase of stripped cane but the outturn of sucrose was comparatively low. Sodium nitrate 300 lbs. and oil-cake 1,000 lbs. per acre gave only a slight increase in total sucrose. The quality of juice with both sodium nitrate and superphosphate was found to be markedly inferior to that obtained with other fertilizers which corroborated previous results.

October planting with two varieties, namely Co. 213 and P.O.J. 2714, gave an increase of 35,920 lbs. of stripped cane in the case of Co. 213 and of 16,400 lbs. in the case of P.O.J. 2714 over the canes planted in March. Hardness of cane is a factor of importance in Assam where the cane crop is subject to ravages by jackals. A puncture test was, therefore, carried out on several varieties. The tested canes may be arranged as follows in order of hardness:—P.O.J. 2714, Co. 331, P.O.J. 2878, Co. 313, Co. 213, Co. 290, *Teli* and Co. 363.

#### (b) *Preservation of Gur.*

The experiment on the preservation of gur in paraffined earthen pots was continued. Gur preserved in the treated pots kept well and sold readily. This is in agreement with previous experience.

#### (10) *Bombay.*

##### (a) *Varietal, Manurial and Cultural Experiments on Sugarcane.*

Trials of cane varieties at the Kopergaon farm in Bombay showed that the plant cane E.K. 28 gave the highest yield while P.O.J. 2878 gave the lowest yield. As a ratoon cane P.O.J. 2878 gave the highest yield and as stripped cane D. 109 gave the lowest yield of gur per acre. E.K. 28 did well as a ratoon cane also. It was observed that E.K. 28 did not sprout well if it was harvested in December or January. The ratoon sprouted all right if it was harvested in March, but it could not be kept so long if it arrowed in November. P.O.J. 2878 was found to be a little harder than E.K. 28 but it gave the highest brix reading in plant as well as ratoon cane. The sugarcane sorghum hybrids, viz., Co. 357, were planted at Belwandi but they did not seem to mature earlier than 8 months. At the

Kumpta farm, Co. 281, Co. 290, Co. 231 and H.M. 87 were compared with Red Mauritius according to Fisher's method. Red Mauritius was found to yield higher tonnage than others.

At the Padegaon Research Station, Bombay-Deccan, final trials were conducted with ten varieties of cane, viz., P.O.J. 2878, Co. 290, Str. D. 109, H. 109; E.K. 28, Co. 360, Co. 402, H. M. 320, H. M. 89 and Pundia, during 1933-34. The behaviour of the different varieties was noted as regards germination, number of tillers and number of canes at harvest, and a record of brix readings was maintained from November onwards. The germination was generally defective owing to the soil having been greatly disturbed by scraping during levelling, and the growth in the early stages was retarded by severe borer attack. But it is noteworthy that the Coimbatore varieties withstood these adverse conditions very well. It is too early to draw any definite conclusions, but the indications were:—

- (1) the Coimbatore selections showed a tendency to do well even on new soils.
- (2) Co. 360 gave equally good results as P.O.J. 2878, but was found to be slightly later than P.O.J. 2878.
- (3) Co. 402 proved to be a very late variety. It was, however, heavy yielding, with consequent low brix.

Preliminary trials, were conducted with certain new selections from Coimbatore and Mysore, and also with selected strains of the sugarcane-sorghum hybrids. Among the five varieties from Coimbatore and Mysore tested, four—Co. 416, Co. 419, H.M. 606 and 609—are reported to be promising. Only one of the hybrids sown out with the sugar material was extremely promising giving out the suitable time for planting these hybrids, trial plantings were done in February and June. It was found that the February plantings had a normal yield while the hybrids tried none showed the maximum purity at six months under the Deccan conditions. In the intermediate trials of cane varieties, four Coimbatore varieties, viz., Cos. 403, 404, 405 and 406, appeared to be promising.

Experiments on the nitrogen requirements of cane were continued at the Kopargaon farm. The results of the year 1933-34. revealed a progressive increase in the yield of plant and ratoon cane with the increase of nitrogen per acre. The average figures also showed the same trend but there was not much difference in the yields of cane and *gur* of ratoon cane top-dressed with 150 lbs. and 200 lbs. nitrogen per acre. The yields of ratoon cane in the year 1930-31 only were much higher in the case of 150 lbs. nitrogen plot than in the plot treated with 200 lbs. nitrogen per acre; otherwise the results were in favour of increased doses.

A study of the manurial requirements of sugarcane is in progress at the Sugarcane Research Station, Padegaon. The experimental plots were laid out on medium soil and planting was done with single eye-buds to facilitate periodical removal of clumps. The layout was as follows:—

Treatment.	Variety.
(1) 150 lbs. N. . . .	Pundia.
(2) 150 lbs. N. . . .	P.O.J. 2878.
(3) 300 lbs. N. . . .	Do.
(4) 50 lbs. N. . . .	Do.

Except the manuring dose, methods of cultivation, irrigation, etc., were exactly according to the standard *Manjri* method. It was found that applications of varying amounts of ammonium sulphate had practically no effect either on the rate or the total percentage of germination. The rate of increase of dry weight was found to be different for each variety. While Pundia was highly susceptible to atmospheric factors, especially humidity, P.O.J. 2878 appeared to be much more independent of external environment. The relative efficiency of the 50, 150 and 300 lbs. nitrogen treatments from the standpoint of yield was worked out to be 0.8 : 1 : 1.5. It was found that the 50-lbs. nitrogen treatment fell short of the requirements of the sugarcane crop. It was also found that plants receiving lower doses of nitrogen ripened earlier. A study of the periodical development of the root-system showed a definite gradient from lower to higher doses of nitrogen. An examination of the intake of mineral nutrients indicated that the intake was very little during the formative stage and very high during the grand period stage. As regards the relative importance of the main elements from the standpoint of intake, potash came first and phosphates last. From the manurial standpoint, however, nitrogen and phosphates were found to be the most important.

Experiments have been carried out at the Kopargaon Farm on the relative merits of the improved method of planting cane (modified *Manjri* Farm method) and the local method. It was found that the yields by the local method were higher than those obtained by the improved method, but the cost of cultivation of the local method was much higher than that of the improved method. With a view to seeing whether cane could be grown on *mal* land without water, seedlings of three Co. varieties were raised on seed beds and transplanted on *mal* lands at the Kumpta Farm. No irrigation was given to the crop after transplanting. Co. 312 gave a fairly good outturn of 3,000 lbs. of liquid *gur* per acre, with a net profit of Rs. 25 per acre. Other important studies on the sugarcane crop at Padegaon consisted of the following:—

- (i) Significance of some of the physical properties of cane soils,
- (ii) Harvest data and botanical observations,

- (iii) Nitrification and nitrogen recuperation in soils,
- (iv) Bioclimatic study,
- (v) Water requirements of sugarcane,
- (vi) Relation of water to manure, and
- (vii) Study on the quality of *gur*.

(b) *Sugar-making by Open Pan Process.*

There were eight places on the Deccan canals where sugar-making was carried on during 1933-34. The varieties E. K. 28 and P. O. J. 2878 were crushed at some places; at other places only Pundia was available. E. K. 28 gave 6.25 per cent of 1st sugar and 1.75 of 2nd sugar on cane. At Hol the recovery of sugar was 5.8 per cent while no 2nd sugar was prepared but only *gur* was made from the molasses. In Satara district similar trials of making sugar by open pan process were made with fair success at six places. During the year 1933-34 new designs were made and used in the working of sugar and *gur* making plants by open pan process. It is reported that these designs gave satisfaction.

(11) North-West Frontier Province.

(a) *Varietal, Cultural and Manurial Experiments on Sugarcane.*

Sugarcane is considered to be one of the most important commercial crops of the province and is especially so in the Peshawar district. Most of the area under sugarcane is covered by the two varieties Pundia and Assam Red which are reported to be largely grown by the *zamindars*. During 1933-34 there were twenty varieties of Coimbatore canes under trial at the Tarnab farm, out of which Co. 285, Co. 403 and Co. 412 are reported to be fairly promising. The two varieties Co. 213 and Co. 290 were ratooned for the third year at the Haripur farm and it was found that Co. 290 was the better variety. Results of the manurial experiments at the Tarnab farm showed that higher yield is obtained by the application of 50 lbs. of  $P_2O_5$  and 80 lbs. of nitrogen in comparison with 40 and 60 lbs. of nitrogen keeping the quantity of  $P_2O_5$  the same. In the case of 75 lbs.  $P_2O_5$  alone and with 40 lbs., 60 lbs. and 80 lbs. of nitrogen higher yield was obtained from the plot receiving 75 lbs. of  $P_2O_5$  and 80 lbs. of nitrogen while in another set of experiments with 100 lbs.  $P_2O_5$  with 40 lbs., 60 lbs., and 80 lbs. of nitrogen, respectively, highest yield was obtained with 100 lbs.  $P_2O_5$  plus 80 lbs. nitrogen. An experiment on a small area was also conducted in order to discover the most suitable time for sowing sugarcane. The variety under trial was Assam Red. The early cane was sown on 22nd February, 1933, and the late on 22nd March, 1933. The results were in favour of early-sown cane.

(b) *Trials of Furnaces and Sugarcane Crushing Mills.*

The double storey furnace was tried against the local. Fuel is a great problem with *zamindars* and

the idea of this experiment was to find out the best furnace from this point of view. Any furnace for making *gur* that would consume less fuel would be welcomed by the *zamindars*. The double storey furnace did not give satisfactory results and further trials were therefore necessary to arrive at a definite conclusion. Two small sugarcane crushing mills were also tried. One of them was reported to be suitable for small growers.

(c) *Cultural Experiments on Sugar Beet.*

The following five varieties of sugar beet were grown:—(1) Suttons improved, (2) Carter No. 1, (3) Guman, (4) German variety E and (5) German variety ZZ. Due to adverse seasonal conditions the germination of the first two varieties was not satisfactory. German (ZZ) was, however, found to be the heaviest yielder.

V.—FISCAL.

During the year under review, the protective duty on foreign sugar remained at Rs. 7-4-0 per cwt. As the revenue surcharge of 25 per cent (amounting to Rs. 1-13-0 per cwt.) was also continued, the total import duty on foreign sugar amounted to Rs. 9-1-0 per cwt.

The import duty on molasses (including the surcharge) continued at 31½ per cent *ad valorem*, tariff valuations of molasses for the purpose of levying duties during 1935 remaining the same as for the year 1934.

The Sugar (Excise Duty) Act of 1934 came into force with effect from the 1st April, 1934. In exercise of the powers conferred by Sections 3 and 7 of the Sugarcane Act, 1934 (Act XV of 1934), the Governments of the United Provinces and of Bihar and Orissa made rules called "The United Provinces Sugarcane Rules, 1934" and "The Bihar and Orissa Sugarcane Rules, 1934" which came into effect from the 1st and 10th December, 1934, respectively. These rules in general specify the areas declared as controlled areas for the purpose of the said Act and fix the minimum prices for the purchase therein of sugarcane intended for use in sugar factories, prohibiting the purchase of sugarcane otherwise than from grower of sugarcane or from licensed purchasing agents.

VI.—ALL-INDIA TRADE IN SUGAR MACHINERY.

The value of sugar machinery imported into India during the year under review was Rs. 1,05,45,439 as against Rs. 3,36,38,814 during the year 1933-34. The following table gives the value of imports of sugar machinery into India from 1925-26 to 1934-35 together with details of countries from which imported and of the share of each maritime province into which the machinery was landed on arrival in India. It will be observed that for the first time machinery was imported from Java and Japan.

TABLE VIII.—Value of Imports of Sugar Machinery together with the Share of each Maritime Province of India during the last Ten Years.

Whence Imported.	1925-26.	1926-27.	1927-28.	1928-29.	1929-30.	1930-31.	1931-32.	1932-33.	1933-34.	1934-35.
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
United Kingdom .	12,31,185	5,55,001	7,25,056	16,30,487	8,49,343	10,82,836	26,22,991	91,48,018	1,95,87,559	73,60,599
Germany . . .	2,47,563	21,489	1,11,287	23,215	8,332	23,233	1,18,070	17,83,649	33,11,442	11,41,661
Netherlands . .	..	..	..	..	..	..	..	10,88,971	60,63,605	6,81,545
Belgium . . .	263	1,385	5,972	..	3,110	..	22,751	31,76,262	34,79,283	18,127
France . . .	54,746	7,804	45,245	61,087	30,421	2,30,323	2,22,297	26,880	39,541	10,30,125
Italy . . .	..	..	..	..	625	..	..	231	13,444	4,305
United States of America.	63,388	35,068	24,638	36,852	28,022	32,324	27,382	16,324	22,021	70,380
Czechoslovakia .	..	..	..	..	..	..	..	68,019	11,13,491	1,83,818
Java . . .	..	..	..	..	..	..	..	..	..	32,428
Japan . . .	..	..	..	..	..	..	..	..	..	20,586
Other Countries .	..	..	..	..	1,226	..	358	2,772	18,428	1,946
<b>TOTAL</b>	<b>5,97,117</b>	<b>6,20,837</b>	<b>9,13,208</b>	<b>17,51,611</b>	<b>9,21,079</b>	<b>13,68,716</b>	<b>30,14,440</b>	<b>1,53,11,126</b>	<b>3,36,38,814</b>	<b>1,05,45,439</b>
Share of Bengal .	14,92,474	5,30,842	7,14,816	16,54,119	5,44,083	12,45,079	27,68,436	1,31,53,619	2,13,94,749	48,49,907
Share of Bombay .	70,690	54,246	43,581	73,794	33,642	90,186	72,348	11,08,916	65,93,005	24,02,972
Share of Sind . .	6,229	2,856	10,923	517	3,17,256	19,405	60,563	6,26,660	46,98,396	7,89,255
Share of Madras .	19,286	10,826	1,27,535	22,906	14,790	12,062	1,02,945	4,18,783	8,06,848	16,22,587
Share of Burma .	8,438	13,067	16,443	305	11,308	1,084	1,157	3,248	55,816	8,80,716
<b>TOTAL</b>	<b>15,97,117</b>	<b>6,20,837</b>	<b>9,13,208</b>	<b>17,51,611</b>	<b>9,21,079</b>	<b>13,68,716</b>	<b>30,14,440</b>	<b>1,53,11,126</b>	<b>3,36,38,814</b>	<b>1,05,45,439</b>

## VII.—ALL-INDIA SUGAR TRADE.

## (1) Gur.

(a) *Production*\*.—The net production of *gur* in India is estimated at 3,692,000 tons as against 3,477,000 tons in the preceding season. The total increase in the output of *gur* during the season 1934-35 over that of the previous season, amounts to 215,000 tons or about 6.2 per cent. The following table shows the calculated net production of *gur* in India during the last ten years:—

TABLE IX.—Calculated Net Production of Gur in India for Direct Consumption.

Year.	Calculated Net Production of Gur.
	Tons.
1925-26 . . . . .	2,089,000
1926-27 . . . . .	2,313,000
1927-28 . . . . .	2,276,000
1928-29 . . . . .	1,778,000
1929-30 . . . . .	1,837,000
1930-31 . . . . .	2,245,000
1931-32 . . . . .	2,772,000
1932-33 . . . . .	3,245,000
1933-34 . . . . .	3,477,000
1934-35 . . . . .	3,692,000

\* Figures for net production are calculated from the figures for total yield of *gur* in the "Final General Memorandum" each year by allowing for the *gur* equivalent of cane used for other purposes (adopting the conversion factor of 10).

(b) *Imports by Land*.—There were no imports of *gur* and *jaggery* by land from countries situated on India's borders, and imports of the commodity through land frontier routes of Burma amounted to about 24 tons as against 38 tons in the preceding year.

(c) *Exports by Sea and by Land*.—The exports by sea of cane *jaggery* and palm *jaggery* amounted to 1,153 tons valued at Rs. 1,80,197 as against 1,201 tons valued at Rs. 1,73,162 during the preceding year, of which Ceylon took 890 tons valued at Rs. 1,35,011. The exports by land of unrefined sugar from India and Burma totalled 4,176 tons as against 6,286 tons in 1933-34.

## (2) Sugar.

(a) *Home Production*.—As already stated, the production of sugar by modern factories and refineries in India was 515,059 tons in 1933-34 as compared with 370,283 tons in 1932-33. Adding to this total an estimated production of 200,000 tons of sugar manufactured by the indigenous process the total production for 1933-34 amounts to 715,059 tons. In 1934-35 production of sugar direct from cane amounted to 578,115 tons. The quantity of sugar manufactured by refineries and by the indigenous process during 1934-35 is estimated at 40,000 tons and 150,000 tons, respectively. The total production thus amounts to 768,115 tons.

(b) *Exports of Indian Sugar by Sea*.—Exports of sugar from India by sea amounted to 363 tons valued

at Rs. 63,086 as against 425 tons valued at Rs. 64,451 last year.

(c) *Imports of Foreign Sugar by Sea.*—The imports of sugar, excluding molasses, into British Indian ports\* during 1934-35 amounted to 222,900 tons valued at Rs. 2,11 lakhs compared with 261,300 tons valued at Rs. 2,70 lakhs during 1933-34. The quantity of Java sugar imported into India amounted to 175,900 tons during the year under report as against 194,400 tons during the previous year. Imports of beet sugar also decreased to 26,811 tons valued at Rs. 24 lakhs as compared with 27,556 tons valued at Rs. 28 lakhs. Imports of Java sugar

\* This is exclusive of imports into Kathiawar Ports.

TABLE X.—Imports of Sugar, All Kinds, excluding Molasses.

Countries from which Imported.	1913-14 (Pre-war).	1929-30.	1930-31.	1931-32.	1932-33.	1933-34.	1934-35.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
United Kingdom . . . . .	900	59,300	8,400	22,900	34,900	36,700	16,800
Ceylon . . . . .	100	3,600	5,700	1,100	100	..	..
Java . . . . .	583,000	781,100	809,700	366,800	294,800	194,400	175,900
Mauritius . . . . .	139,600	..	..	..	..	..	..
Straits Settlements . . . . .	2,900	600	500	400	200	200	200
China and Hongkong . . . . .	1,500	6,100	5,100	5,000	2,200	3,400	3,900
Portuguese East Africa . . . . .	..	600	200	..	12,700	18,200	11,100
Japan . . . . .	100	500	..	100	4,000	3,500	2,700
Germany . . . . .	700	15,200	11,700	15,400	300	..	200
Austria . . . . .	74,000	1,400	..	400	..	..	..
Hungary . . . . .		36,500	13,800	600	..	1,700	..
Netherlands . . . . .	..	2,500	600	600	500	1,300	1,800
Belgium . . . . .	..	1,800	300	200	2,500	1,900	2,100
France . . . . .	..	11,900	..	..	..	..	1,000
Czechoslovakia . . . . .	..	9,700	600	1,100	500	..	100
United States . . . . .	..	200	200	300	..	..	..
Other Countries . . . . .	200	8,600	44,400	101,200	16,800	..	7,100
<b>TOTAL—ALL COUNTRIES</b> . . . . .	<b>803,000</b>	<b>939,600</b>	<b>901,200</b>	<b>516,100</b>	<b>369,500</b>	<b>261,300</b>	<b>222,900</b>
<b>Value—(Rs. lakhs)</b> . . . . .	<b>14,29</b>	<b>15,51</b>	<b>10,54</b>	<b>6,01</b>	<b>4,12</b>	<b>2,70</b>	<b>2,11</b>

(d) *Imports of Sugar by Land.*—There were no imports of foreign refined sugar from countries situated on India's borders. A portion of foreign sugar imported into Kathiawar ports enters British Territory across the land customs line at Viramgam and Dhandhuka. The quantity so imported during the year was 27,580 tons against 26,370 tons in the preceding year.

(e) *Re-exports.*—The re-exports of imported sugar from India showed a considerable decrease having gone down from 11,526 tons valued at Rs. 7,25,602 in 1933-34 to 2,604 tons valued at Rs. 6,09,814 in 1934-35.

into the different maritime provinces of India were as under :—

Province.	1934-35.	1933-34.
	Tons.	Tons.
Bengal . . . . .	20,000 (11 p. c.)	23,000 (11.8 p. c.)
Bombay . . . . .	58,000 (34 p. c.)	74,700 (38.4 p. c.)
Sind . . . . .	34,000 (19 p. c.)	33,900 (17.5 p. c.)
Madras . . . . .	47,000 (26 p. c.)	43,900 (22.6 p. c.)
Burma . . . . .	17,000 (10 p. c.)	18,900 (9.7 p. c.)

The following table taken from the *Review of the Trade of India in 1934-35* gives the figures for imports of sugar for the six years 1929-30 to 1934-35 as compared with pre-war year 1913-14 :—

The following table gives the details of the re-exports for the last two years 1933-34 and 1934-35 :—

TABLE XI.—Re-exports of Sugar from British India\*

	QUANTITY.		VALUE.	
	1933-34.	1934-35.	1933-34.	1934-35.
	Tons.	Tons.	Rs.	Rs.
Sugar, 23 D. S. and above—				
To Iraq . . . . .	105	24	16,530	3,500
„ Arabia . . . . .	1,491	781	3,72,090	1,91,968
„ Iran . . . . .	488	252	85,075	51,229
„ Kenya Colony and Zanzibar and Pemba . . . . .	113	6	24,875	1,170
„ Other Countries . . . . .	801	1,531	1,63,279	3,58,017
<b>TOTAL</b> . . . . .	<b>2,998</b>	<b>2,504</b>	<b>6,61,840</b>	<b>6,03,884</b>
Sugar, below 23 D. S. but not below 16 D. S.	..	..	..	30
Sugar, 15 D. S. and below . . . . .	8,528	10	63,753	900
<b>TOTAL OF SUGAR</b> . . . . .	<b>11,526</b>	<b>2,604</b>	<b>7,25,602</b>	<b>6,09,814</b>

(f) *Exports by Land of Refined Sugar*.—Exports through Indian and Burmese frontiers amounted to 34,034 tons during the year under report as against 33,110 tons during the previous year.

(g) \* *Consumption (or Distribution)*.—The sugar required for consumption is partly imported (by land and by sea) and partly manufactured in the country from cane and *gur* in modern factories and by indigenous methods in *Khandsari* concerns. Details of the quantities of sugar available for consumption in India during 1934-35 are given below :—

<i>Total Gross Supply.</i>		Tons.
Initial stocks on 1st April, 1934 . . .		25,350
India's production of sugar of the previous year (1933-34) for consumption during 1934-35—		
(a) Direct from cane . . .		453,965
(b) Refined from <i>gur</i> . . .		61,094
(c) Made by indigenous process . . .		200,000
Imports of sugar by sea . . .		222,900
Imports of sugar by sea into Kathiawar ports . . .		110,963
<b>TOTAL SUPPLY</b> . . .		<b>1,074,272</b>
<i>Quantity to be deducted.</i>		
Re-exports of sugar by sea . . .		2,604
Exports of sugar by sea . . .		363
Exports of sugar by land . . .		34,034
Closing stocks on 31st March, 1935 . . .		22,373
<b>TOTAL TO BE DEDUCTED</b> . . .		<b>50,374</b>
Net quantity available for Consumption in 1934-35 . . .		1,014,898
As against . . .		931,877
		<i>in 1933-34.</i>

In calculating the consumption of sugar in British India the gross imports of sugar into the Kathiawar ports were not taken into consideration in previous years but only the quantity of sugar which entered British territories across the land customs line at Viramgam and Dhandhuka as the statistics for imports of sugar into Kathiawar ports were not available. As these statistics are now available they have been included in the year under review. Figures for consumption for the previous years have also been revised and are now presented on a similar basis.

A consolidated statement showing the sources of supply of sugar required for consumption in India

\* The figures of total supply do not include—

- (i) Imports of sugar into India across the land frontiers of the French and Portuguese Settlements, and
- (ii) Imports of sugar into Indian State ports other than those of Kathiawar.

from 1931-32 to 1934-35 is given in the following table :—

TABLE XII.—*Sources of Supply of Sugar Required for Consumption in India.*

—	1931-32.	1932-33.	1933-34.	1934-35.
	Tons.	Tons.	Tons.	Tons.
<b>Total Gross Supply—</b>				
Initial Stock† . . .	167,862	67,878	22,316	25,350
India's production of sugar of the previous year for consumption in the next year—				
(a) Direct from Cane	119,859	158,581	290,177	453,965
(b) Refined from <i>Gur</i>	31,791	60,539	80,106	61,094
(c) Made by indigenous process.	200,000	250,000	275,000	200,000
India's imports of sugar by sea.	516,083	369,450	261,299	222,900
India's imports of sugar by sea into Kathiawar ports.	93,451‡	63,788	73,390	110,963
<b>TOTAL SUPPLY</b> . . .	<b>1,119,046</b>	<b>979,236</b>	<b>1,002,288</b>	<b>1,074,272</b>
Re-exports of sugar by sea.	5,630	4,043	11,526	2,604
Exports of sugar by sea	226	437	425	363
Exports of sugar by land.	28,885	27,729	33,110	34,034
Closing stocks‡ . . .	67,878	22,316	25,350	22,373
<b>TOTAL TO BE DEDUCTED</b>	<b>102,619</b>	<b>54,526</b>	<b>70,411</b>	<b>50,374</b>
Net quantity available for Consumption.	1,016,427	925,710	931,877	1,014,898

† These figures do not include the initial and closing stocks in Kathiawar ports.

‡ Includes Molasses.

### (3) Molasses.

Imports of molasses amounted to only 415 tons valued at Rs. 8,371 as against 2,401 tons valued at Rs. 68,388 in 1933-34. India's own production of molasses is estimated at 410,000 tons during the year 1934-35, as against 430,000 tons last year.

### (4) Confectionery.

The imports of confectionery exclusive of Jams and Jellies amounted to 1,360 tons valued at Rs. 17.93 lakhs compared with 1,139 tons valued at Rs. 17.49 lakhs.

During the year under review 35,418 lbs. of saccharine valued at Rs. 2,42,447 were imported as against 34,962 lbs. worth Rs. 2,42,858.



## VIII.—SUGAR TRADE BY PROVINCES.

## (1) Bengal.

Imports of refined sugar decreased from 27,550 tons valued at Rs. 30.05 lakhs to 22,762 tons valued at Rs. 25.23 lakhs. The bulk of the supply was from Java amounting to 19,844 tons during the year

under review as against 22,977 tons in the preceding year. There were no imports of beet sugar this year also. Imports of molasses from Java amounted to only 415 tons compared with 2,380 tons in 1933-34 and 29,580 tons in 1932-33.

The following table shows the imports of sugar in Bengal during the three years 1932-33 to 1934-35:—

TABLE XIII.—Imports of Sugar in Bengal.

Countries from which Imported.	1932-33.		1933-34.		1934-35.	
	Tons.	Value in Rs. lakhs.	Tons.	Value in Rs. lakhs.	Tons.	Value in Rs. lakhs.
<i>Sugar 23 D. S. and above—</i>						
From United Kingdom . . . .	651	1.95	1,866	2.37	295	0.55
„ Straits Settlements . . . .	12	0.02	10	0.02	..	..
„ Hongkong . . . . .	7	0.01	160	0.32	34	0.07
„ Czechoslovakia . . . . .	60	0.19	..	..	..	..
„ Germany . . . . .	10	0.03	..	..	..	..
„ Netherlands . . . . .	30	0.04	40	0.05	10	0.03
„ Java . . . . .	85,000	106.72	22,977	23.77	19,844	21.04
„ China . . . . .	509	1.02	416	0.62	699	1.10
„ Japan . . . . .	102	0.20	11	0.03	34	0.01
„ Southern Russia . . . . .	..	..	..	..	..	..
„ Other Countries . . . . .	..	..	..	..	..	..
<b>TOTAL</b> . . . . .	<b>86,981</b>	<b>110.18</b>	<b>25,480</b>	<b>27.18</b>	<b>20,916</b>	<b>22.83</b>
<i>Sugar below 23 D. S. but not below 16 D. S.—</i>						
From United Kingdom . . . .	1	0.01	Negligible	Negligible	Negligible	
„ Straits Settlements . . . .	34	0.08	..	..	38	0.05
„ Java . . . . .	2	..	..	..	..	..
„ China (including Hongkong) .	355	0.63	1,445	1.89	1,537	2.00
„ Japan . . . . .	1,110	1.87	625	0.97	271	0.34
<b>TOTAL</b> . . . . .	<b>1,502</b>	<b>2.59</b>	<b>2,070</b>	<b>2.86</b>	<b>1,946</b>	<b>2.39</b>
<i>Sugar 15 D. S. and below—</i>						
From United Kingdom . . . .	1	0.04 0.03 0.06 0.03	Negligible.		Negligible.	
„ Germany . . . . .	..					
„ Czechoslovakia . . . . .	12					
„ Japan . . . . .	12					
„ United States of America .	29					
„ Netherlands . . . . .	13	0.03	..	..	..	..
„ Other Countries . . . . .	..	..	..	..	..	..
<b>TOTAL</b> . . . . .	<b>67</b>	<b>0.16</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>
<i>Beet Sugar—</i>						
From Netherlands . . . . .	20	0.02	Nil		Nil	
<i>Molasses—</i>						
From Java . . . . .	29,580	9.40	2,380	0.67	415	0.03

The price of Java white sugar in Calcutta was Rs. 10-1-0 per maund on the 6th April, 1934, compared with Rs. 9-4-0 per maund for Indian sugar on the same date. The price for Java dropped to Rs. 10-0-0 in the succeeding month and by a further 2 annas in June. In August there was a further depreciation to Rs. 9-12-6, but in September an improved consumer's demand was responsible for a

rise to Rs. 9-14-0 on the 14th of that month as compared with Rs. 9-10-0 for Indian sugar. By the end of November Javas touched Rs. 9-6-0 while the price for the Indian sugar was Rs. 9-1-0; December saw prices nearly at the same level. In January, 1935, there was a revival of demand and stocks were also low. The price for Java sugar reached Rs. 9-9-0 during the last week of January while the beginning



of February saw another advance by 1 anna. But the rates again dropped in the absence of a strong demand the market anticipating a further fall in values. During the remaining portion of February and throughout March prices moved within narrow limits and the year closed with the price of Java sugar at Rs. 9-9-0 and of Indian sugar at Rs. 9-1-6.

## (2) Sind.

The following table taken from the Report on the Maritime Trade of Sind for the official year 1934-35 shows imports, both from foreign countries and from Bombay, re-exports to foreign countries and coastwise exports of sugar for the past five years:—

TABLE XIV.—Details of Import and Export Trade in Sugar of Karachi.

Countries.	1930-31.		1931-32.		1932-33.		1933-34.		1934-35.	
	Tons.	Rs. in lakhs.	Tons.	Rs. in lakhs.	Tons.	Rs. in lakhs.	Tons.	Rs. in lakhs.	Tons.	Rs. in lakhs.
United Kingdom . . .	7,060	7-58	15,142	17-04	22,905	23-06	21,131	21-32	12,477	10-92
U. S. S. R., Southern . .	16,267	10-00	21,311	22-05	3,588	2-50	..	..	..	..
Poland . . . . .	1,403	1-77	4,818	5-59	..	..	..	..	3,446	2-84
Germany . . . . .	6,153	7-16	14,969	17-21	10	0-02	..	..	34	0-06
Belgium . . . . .	314	0-03	171	0-33	121	0-23	1,857	2-93	773	0-67
France . . . . .	..	..	..	..	..	..	..	..	1,055	0-84
Hungary . . . . .	12,248	14-18	495	0-54	..	..	1,634	1-64	..	..
Czechoslovakia . . . .	0	0-02	..	..	..	..	..	..	..	..
Austria . . . . .	..	..	400	0-47	..	..	..	..	..	..
Java . . . . .	184,296	2,14-06	54,857	59-22	56,847	59-38	33,008	33-40	34,141	28-11
Ecuador . . . . .	..	..	..	..	5,453	6-38	..	..	..	..
Portuguese East Africa .	..	..	..	..	..	..	2,967	2-95	..	..
Japan . . . . .	..	..	..	..	150	0-24	117	0-17	90	0-10
Other Foreign Countries .	79	0-16	27	0-06	31	0-07	24	0-05	36	0-08
TOTAL . . . . .	227,809	2,62-29	112,219	1,23-41	89,105	92-87	61,688	62-55	52,052	43-02
Imports from Bombay . .	1	0-01	2,001	4-06	..	..	..	..	..	..
Re-exports . . . . .	856	1-19	2,835	3-42	3,487	4-19	1,866	4-09	1,770	4-75
Exports to Coast Ports .	962	2-43	1,011	2-50	1,330	2-66	3,035	7-60	2,053	5-54

The downward trend in imports of foreign sugar noticed in recent years as the result of the growth of the protected sugar industry in India continued during the year under review. The total quantity imported, viz., 52,052 tons, was less than one-fourth of the quantity (227,809 tons) received only four years ago, i.e., in 1930-31. The continued fall in prices during the year was another factor which rendered business for forward delivery difficult to a very great extent.

The local price of white Java, which opened at Rs. 13-11-0 per cwt. on the 3rd April, 1934, proved to be the highest quotation of the year. A gradual downward tendency soon followed, Rs. 13-8-0 being quoted at the end of April, Rs. 13-4-6 at the end of May and Rs. 13-3-9 at the end of June. The subsequent three months witnessed a partial recovery, the rates ruling in the neighbourhood of Rs. 13-5-0 up to the third week of September, but weakness set in once again and the prices fell abruptly to Rs. 13

at the end of September. They remained steady at that figure up to the middle of January, 1935, but the fourth week of that month recorded a further drop to Rs. 12-14-0, which was the lowest quotation of the year. A slight appreciation was in evidence during February and the first three weeks of March, but the prices were forced back to Rs. 12-14-0, the closing price on 26th March.

## (3) Bombay.

The total import of sugar into Bombay (excluding Sind) amounted to 80,897 tons as against 98,540 tons in 1933-34 showing a decline to the extent of more than 17,000 tons. Arrivals of sugar of 23 D. S. and above, from Java into Bombay, further fell from 74,743 tons to 57,830 tons. Receipts from Portuguese East Africa also declined from 15,218 tons to 11,088 tons. Imports of beet sugar, however, rose from 4,804 tons to 9,218 tons due chiefly to

1,299 tons and 1,054 tons having been imported from Belgium and Poland, respectively, whereas there were no imports from these countries in the previous year. Supplies from the Netherlands also increased from 1,270 tons to 1,776 tons. Details of Bombay's imports for 1932-33 to 1934-35 were as under :—

TABLE XV.—Details of Bombay's Import of Sugar during the Three Years 1932-33 to 1934-35.

Whence Imported.	1932-33.		1933-34.		1934-35.	
	Tons.	Rs.	Tons.	Rs.	Tons.	Rs.
United States of America . . . . .	..	5	..	52	..	2
Germany . . . . .	249	26,968	50	6,000	117	11,845
Franco . . . . .	38	3,750	..	..	..	..
Italy . . . . .	..	22	..	..	..	..
United Kingdom . . . . .	54	19,460	3,559	3,69,156	3,023	3,79,236
Netherlands . . . . .	439	46,362	1,270	1,35,645	1,776	1,76,852
Belgium . . . . .	2,379	2,41,972	10	2,659	1,299	1,27,039
Czechoslovakia . . . . .	434	49,623	..	..	78	7,870
Hongkong . . . . .	783	1,70,792	929	1,36,546	999	1,37,537
Java . . . . .	86,970	89,15,169	74,743	75,02,064	57,830	57,71,839
Poland (including Danzig) . . . . .	..	..	..	..	1,054	1,05,655
Russia . . . . .	5,251	5,29,893	..	..	..	..
Japan . . . . .	2,636	2,89,950	2,750	3,33,470	2,180	2,27,190
Portuguese East Africa . . . . .	12,652	12,73,325	15,218	15,29,602	11,088	10,77,354
Other Countries . . . . .	18	5,058	11	1,823	853	85,727
<b>TOTAL</b> . . . . .	111,903	1,15,72,349	98,540	1,00,17,017	80,897	81,08,146
Re-exports . . . . .	560	83,796	1,135	1,92,939	824	1,33,794
Exports in Coasting Trade (Foreign) . . . . .	12,790	32,91,157	11,600	30,55,622	7,625	20,53,770

The wholesale price of Java 23 D. S. and above which was at Rs. 14-4-0 per cwt. at the beginning of the year, with a downward tendency declined to Rs. 13-13-6 in October, 1934. In November it rose to Rs. 13-14-6 but again declined to Rs. 13-7-0 in December. After a rise to Rs. 13-10-0 in January,

1935, the price again began to fall and stood at Rs. 13-4-0 at the end of the year.

#### (4) Madras.

The following table gives particulars of the sea-borne imports of sugar into the Madras Presidency for the last three years.

TABLE XVI.—Particulars of Sea-borne Imports of Sugar into the Madras Presidency for 1932-33 to 1934-35.

Sugar.	1932-33.		1933-34.		1934-35.	
	Tons.	Rs. in lakhs.	Tons.	Rs. in lakhs.	Tons.	Rs. in lakhs.
<i>Sugar 23 D. S. and above—</i>						
From Java . . . . .	40,817	47-35	43,856	45-61	47,547	41-32
„ Ceylon . . . . .	76	0-09	5	..	2	..
„ United Kingdom . . . . .	10,171	10-82	9,982	10-48	369	0-39
„ Southern Russia . . . . .	2,333	2-65	..	..	..	..
„ Egypt . . . . .	..	..	..	..	1,700	1-44
„ Other Countries . . . . .	80	0-16	19	0-04	29	0-06
<b>TOTAL</b> . . . . .	53,477	61-07	53,862	56-13	49,647	43-21

TABLE XVI.—Particulars of Sea-borne Imports of Sugar into the Madras Presidency for 1932-33 to 1934-35  
—contd.

Sugar.	1932-33.		1933-34.		1934-35.	
	Tons.	Rs. in lakhs.	Tons.	Rs. in lakhs.	Tons.	Rs. in lakhs.
<i>Sugar below 23 D. S. but not below 16 D. S.—</i>						
From Belgium . . . . .	..	..	22	0-04	146	0-22
" Straits Settlements . . . . .	..	..				
" China, etc. . . . .	..	..				
" Japan . . . . .	..	..				
" Java . . . . .	..	..				
TOTAL . . . . .	..	..	22	0-04	146	0-22
<i>Sugar 15 D. S. and below—</i>						
From Java . . . . .	..	..	..	..	..	..
" Other Countries . . . . .	2	..	..	..	..	..
TOTAL . . . . .	2	..	..	..	..	..
<i>Molasses—</i>						
From Java . . . . .	1,831	1-02	..	..	..	..
" Other Countries . . . . .	..	..	..	..	..	..
TOTAL . . . . .	1,831	1-02	..	..	..	..
GRAND TOTAL . . . . .	55,310	62-09	53,884	56-17	49,793	3-43

The price of Java white sugar was Rs. 13-12-0 per cwt. in the beginning of April, 1934, which rose to Rs. 14-0-0 during the third week of the month. A downward tendency then followed and the prices, after minor fluctuations, stood at Rs. 13-8-0 and Rs. 13-5-6 by the end of May and June, respectively. After the first week of July a more healthy tone was noticeable and the price again improved to Rs. 13-12-0 during the third week of July which, however, declined to Rs. 13-6-0 during the last week of August. During September the price fluctuated between Rs. 13-12-0 and Rs. 13-8-0 standing at Rs. 13-8-0 at the end of the month, but this gradually declined to Rs. 13-2-0 on the 31st of October. The price further declined to Rs. 13-0-6, the lowest quotation of the year, during the third week of November.

A partial recovery soon followed the price standing at Rs. 13-9-0 at the end of the month. There was a downward tendency in December and the price stood at Rs. 13-5-0 at the end of the month. In January, 1935, the price again rose going up to Rs. 14-0-0 by the end of that month. Prices were practically at Rs. 13-10-0 in the months of February and March.

## (5) Burma.

Imports of refined sugar during the year under review showed a decrease of 2,221 tons over the previous year. The following table gives the imports of foreign sugar into Burma for the last three years from 1932-33 to 1934-35:—

TABLE XVII.—Imports of Sugar into Burma.

Description of Sugar.	1932-33.		1933-34.		1934-35.	
	Tons.	Rs. in lakhs.	Tons.	Rs. in lakhs.	Tons.	Rs. in lakhs.
Sugar 16 D. S. and above . . . . .	26,392	29-57	19,649	21-34	17,428	17-41
Molasses . . . . .	182	0-11	21	0-01	..	..
TOTAL . . . . .	26,574	29-68	19,670	21-35	17,428	17-41

The price of Java white sugar 23 D. S. and above was Rs. 14 per cwt. during the month of April, 1934. It remained practically steady during May and June but rose to Rs. 14-7-0 during the latter half of July. The prices then declined to Rs. 13-11-0 in the last week of July and remained at that level during August and the first two weeks of September. During the third week of September the price again rose to Rs. 14 and remained at that level during October. In the first week of November, however, the price declined to Rs. 13-6-0 and showed practically no fluctuation till the end of December. The price rose to Rs. 13-11-0 in January, 1935, and remained at

that figure during February and the first two weeks of March, again declining to Rs. 13-6-0 during the latter half of March, 1935.

#### (6) Kathiawar States.

The total imports of sugar into the Maritime States in Kathiawar amounted to 110,963 tons in the year 1934-35 as against 73,390 tons and 63,788 tons in 1933-34 and 1932-33, respectively. There was no import of molasses during the year under review while it amounted to only 5 tons in each of the previous two years. The table below shows the details of imports from 1932-33 to 1934-35 :—

TABLE XVIII.—Details of Kathiawar Ports' Imports of Sugar during the Three Years 1932-33 to 1934-35.

Countries from which Imported.	1932-33.		1933-34.		1934-35.	
	Tons.	Rs.	Tons.	Rs.	Tons.	Rs.
<i>Sugar 23 D. S. and above—</i>						
From United Kingdom . . . .	1	144	1,085	1,08,592	.. 1	.. 107
„ Straits Settlements . . . .	..	..	1	201	..	..
„ Java . . . . .	57,605	69,69,068	60,078	61,09,350	100,570	8,72,187
„ Hongkong . . . . .	28	5,009	58	10,346	115	15,424
„ China (exclusive of Hongkong and Macão). . . . .	56	578	14	2,430	11	1,800
„ Japan . . . . .	37	5,075	630	85,522	132	17,163
„ Other Countries . . . . .	..	..	5,860	6,00,990	149	13,878
<b>TOTAL</b> . . . . .	<b>57,727</b>	<b>69,79,874</b>	<b>67,726</b>	<b>69,17,431</b>	<b>100,978</b>	<b>89,20,559</b>
<i>Sugar below 23 D. S. but not below 16 D. S.—</i>						
From United Kingdom . . . .	..	..	..	..	..	111
„ Java . . . . .	508	1,01,221	..	..	..	..
„ Hongkong . . . . .	8	1,710	3	566	..	..
„ China (exclusive of Hongkong and Macão). . . . .	15	2,492	..	..	..	..
„ Japan . . . . .	153	26,420	19	2,906	..	..
<b>TOTAL</b> . . . . .	<b>684</b>	<b>1,31,843</b>	<b>22</b>	<b>3,472</b>	<b>..</b>	<b>111</b>
<i>Beet Sugar—</i>						
From United Kingdom . . . .	4,888	4,76,014	3,532	3,73,200	2,988	2,83,010
„ Union of Socialist Soviet Republics. . . . .	272	28,538	..	..	..	..
„ Poland . . . . .	..	..	..	..	4,000	2,00,000
„ Other Countries . . . . .	..	..	1,499	1,40,980	..	..
<b>TOTAL</b> . . . . .	<b>5,160</b>	<b>5,04,552</b>	<b>5,031</b>	<b>5,23,180</b>	<b>6,988</b>	<b>4,83,010</b>
<i>Sugar 15 D. S. and below</i> . . . .	<b>217</b>	<b>34,921</b>	<b>611</b>	<b>66,704</b>	<b>2,997</b>	<b>2,61,280</b>
<i>Molasses</i> . . . . .	<b>5</b>	<b>2,301</b>	<b>5</b>	<b>(a)</b>	<b>..</b>	<b>..</b>
<b>TOTAL</b> . . . . .	<b>63,793</b>	<b>76,53,491</b>	<b>73,395</b>	<b>75,10,787</b>	<b>1,10,963</b>	<b>96,57,999</b>

(a) Not available.

As already pointed out in Section VII of this review, a portion of foreign sugar imported into Kathiawar ports enters British territory across the land customs line at Viramgam and Dhandhuka. The quantity so imported during the year was 27,580 tons against 26,370 tons and 34,357 tons,

respectively, in 1933-34 and 1932-33. The following table shows the total imports of sugar (*excluding* molasses) into Kathiawar ports as well as the quantity of sugar that entered British territory through the land customs line during the years 1931-32 to 1934-35.

TABLE XIX.—Imports of Sugar into Kathiawar Ports and the Imports of Sugar into British India from Kathiawar through Land Customs Line during the Four Years 1931-32 to 1934-35.

	1931-32.	1932-33.	1933-34.	1934-35.
	Tons.	Tons.	Tons.	Tons.
(1) Imports of sugar into Kathiawar ports . . . . .	*93,451	63,785	73,390	110,963
(2) Imports of sugar into British India from Kathiawar across the Viramgam-Dhandhuka Land Customs Line.	59,564	34,357	26,370	27,580

\* Includes molasses.

#### IX.—MONTHLY SUGAR PRICES.

A statement showing the monthly average price of ready Java White Sugar in the principal Indian ports and of Factory-made sugar (Cawnpore Special) in the Cawnpore market is given below. The latter is a well-known grade of sugar refined from *gur* and prices for it have, therefore, been given for comparison with those of Java sugar. In view of the larger production of sugar directly from cane in India, average prices for Marhowrah Crystal No. 1 (Factory delivery basis as quoted in the Cawnpore market) have also been included in the statement. This is a typical first grade sugar as turned out by Indian Mills.

son with those of Java sugar. In view of the larger production of sugar directly from cane in India, average prices for Marhowrah Crystal No. 1 (Factory delivery basis as quoted in the Cawnpore market) have also been included in the statement. This is a typical first grade sugar as turned out by Indian Mills.

TABLE XX.—Statement showing the Monthly Average Price of Ready Java White Sugar per Maund for the Year 1934-35.

Month.	Calcutta.	Rangoon.	Bombay.	Karachi.	Madras.	Cawnpore Special Sugar. (Factory delivery basis, Cawnpore market) Average price per maund.	Marhowrah Crystal No. 1. (Factory delivery basis, Cawnpore market) Average price per maund.
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
April, 1934 . . . .	10 1 0	10 1 0	10 5 0	9 15 0	10 3 0	8 11 0	9 2 0
May, 1934 . . . .	9 15 0	9 15 0	10 4 0	9 13 0	10 0 0	9 0 0	9 2 0
June, 1934 . . . .	9 12 0	9 14 0	10 2 0	9 11 0	9 13 0	8 15 0	8 15 0
July, 1934 . . . .	9 12 0	9 13 0	10 4 0	9 12 0	10 0 0	9 0 0	8 15 0
August, 1934 . . .	9 14 0	9 15 0	10 2 0	9 12 0	9 15 0	9 0 0	8 15 0
September, 1934 . .	9 13 0	10 9 0	10 0 0	9 11 0	10 0 0	9 1 0	9 1 0
October, 1934 . . .	9 10 0	10 1 0	10 1 0	9 8 0	9 13 0	9 0 0	9 0 0
November, 1934 . .	9 8 0	9 15 0	10 1 0	9 8 0	9 11 0	8 9 0	8 7 0
December, 1934 . .	9 5 0	9 10 0	9 13 0	9 8 0	9 13 0	8 7 0	8 2 0
January, 1935 . . .	9 11 0	9 11 0	9 13 0	9 9 0	10 0 0	8 7 0	8 6 0
February, 1935 . . .	9 9 0	9 13 0	10 0 0	9 12 0	10 0 0	8 14 0	8 8 0
March, 1935 . . . .	9 9 0	9 10 0	9 11 0	9 10 0	10 0 0	8 15 0	8 8 0

## X.—REVIEW OF THE SUGAR TRADE OF JAVA.

## 1. General Condition of Java Sugar Industry.

The year 1934 witnessed another drastic reduction in the sugar industry of Java. Only 47 factories worked during the year as against 99 and 166 factories in 1933 and 1932, respectively. The area planted and harvested was 93,613 acres as against 208,947 acres in the preceding year. The total amount of cane harvested was 5,152,122 tons as against 11,088,662 tons last year. Average tonnage of cane amounted to 55.01 tons per acre; the highest figure for one group reported was 67.19 tons per acre, while the lowest reported was 47.09 tons per acre.

The sugar content of the cane was good; the average extraction reached 12.35. The highest recovery during 1934 for a group was 13.49 per cent while the lowest was 10.53 per cent. The largest average yield of sugar per acre for a group was reported to be 17,342 lbs. and the lowest 13,733 lbs. as against 15,693 lbs. and 12,922 lbs., respectively, in the previous year. The maximum figure for one single factory amounted to 18,058 lbs. sugar per acre, as against 18,164 lbs. in the year 1933.

The final figures for the production of sugar in Java in 1934 were:—

	Metric Tons.
Superior white sugar . . . . .	542,617
Brown sugar . . . . .	89,168
Molasses sugar . . . . .	14,440
Bag sugar . . . . .	20
<b>TOTAL</b> . . . . .	<b>646,245</b>
Against { 1,401,327 metric tons in 1933.	
{ 2,610,500 metric tons in 1932.	

The table below gives the number of factories operating and the cane acreage in Java from 1925 to 1934 according to figures published by Dr. Prinsen Geerligs:—

TABLE XXI.—Number of Factories operating and the Cane Acreage in Java.

Year.	Number of Factories Operating.	Area under Cane.	Cane harvested in Tons per Acre.
		Acres.	Tons.
1925 . . . . .	179	439,695	43.19
1926 . . . . .	178	444,038	42.08
1927 . . . . .	178	455,806	46.04
1928 . . . . .	178	481,863	52.53
1929 . . . . .	179	486,799	49.59
1930 . . . . .	179	489,984	51.54
1931 . . . . .	178	493,721	52.70
1932 . . . . .	166	423,924	53.25
1933 . . . . .	99	208,947	52.21
1934 . . . . .	47	93,613	55.01

## 2. Marketing of Sugar.

The principle of making concessions in price to destinations where the competition of British Refined was felt, was extended during the year to all markets where competition was felt from foreign sugars. This was particularly the case in China, where some parcels of American granulated were sold. Reductions were given on Browns to refiners in Japan, New Zealand and Hongkong. Shipments to the two first named countries amounted to 142,611 tons and 61,653 tons, respectively, against 182,807 tons and 63,301 tons during 1933. Fair business was done in "New Assortment" to England at reduced prices, the total quantity sold being about 80,000 tons.

In the beginning of the year the prices were ruling as under:—

Whites—	
"Free" export . . . . .	f. 5.50
India—West Coast . . . . .	f. 4.00
India—East Coast . . . . .	f. 4.10
China . . . . .	f. 4.75
Browns—	
"Free" export . . . . .	f. 5.10
China . . . . .	f. 4.50
Refiners . . . . .	f. 3.60

Towards the end of January a slight increase was asked for to all destinations except China, while a further rise was made early in February. The only exception made was in the price of Browns to China, for which a slight decrease was made. Small lots of Whites were sold to Europe at f. 3.95, which were followed a few weeks later by further lots at slightly reduced prices. Business slackening off, the prices for Whites to India, and Browns to Japan eased somewhat early in March and fair business resulted at f. 4.10 to India and f. 3.85 for Browns to Japan.

Early in April 5,000 tons Whites went to Vladivostok at f. 4.10, while Browns were sold to Japan at f. 3.55, and Whites to India at f. 4.00.

For some time the market remained extremely dull and prices sagged slightly, partly as the result of offerings of Polish crystals and British Refined in India, and by early May prices were f. 3.70 for Whites to India, f. 4.50 to China, and f. 3.40 for Browns to Japan.

Nivas total sale of sugar amounted to only 167,843 tons up to the end of May. Owing to drought in Europe the Nivas then raised their prices and sold large quantities to British India and China, making the total sales of Java sugar on July 1st, 260,694 tons. Large sales took place thereafter for British Indian destinations, so that the total amount exported reached the figure of 418,373 tons by the 1st of August.

Business then became better still and large sales were reported to China, British India, Japan and New Zealand at improved prices. The interest, however, slackened soon and some reduction had to be made in price for attracting buyers.

During September offerings of American Granulated to China were reported and the Nivas made further concessions to that destination with the result that the turnover improved. The market in general, however, remained very dull and prices declined steadily for all destinations so that early in November f. 3-25 was accepted for China, f. 2-85 for West Coast India, f. 2-65 West of Suez and f. 2-85 for Browns to Japan. These prices were recorded as the lowest of the year after which an all-round improvement in prices was noticed and by the end of the month f. 3-15 was paid for India West Coast, f. 3-40 for China, and f. 3-00 for Browns to Japan.

Prices ruling at the end of the year were as under :—

Whites—	
Shanghai . . . . .	f. 3-20
Hongkong . . . . .	f. 3-30
West Coast India . . . . .	f. 3-10
East Coast India . . . . .	f. 3-15
Browns—	
Japan . . . . .	f. 3-00

No business was done in soft sugars during the year. Business done in molasses sugar during the year was only about 13,000 tons.

The total amount of sugar sold by the Nivas up to the end of December, 1934, was as under :—

Whites . . . . .	873,000 tons (1,000 Kgs.)
Browns . . . . .	427,500 "
Molasses sugar . . . . .	13,000 "
<b>TOTAL . . . . .</b>	<b>1,313,500 "</b>

Prices at the beginning of 1935 were as follows :—  
3-15 Guilders for Whites to the West Coast of British India ; 3-20 Guilders to the East Coast ; 3-25 Guilders to Shanghai ; and 3-55 Guilders to Hongkong. Browns to Japan were sold at 3-00 Guilders. Large sales, chiefly to British India, were made in the month of January at prices which rose slightly. By the end of January the sales had amounted to 1,509,661 tons, after which business remained very small, giving a total sale of sugar in the period 1st April, 1934, to 31st March, 1935, of 1,646,324 tons.

### 3. Statistical Position.

The statistical position of Java on 1st April, 1935, was as under :—

	<b>Tons.</b>
Estimated carry-over on 1st April, 1934	2,491,179
Crop 1934 . . . . .	646,245
<b>TOTAL SUPPLY . . . . .</b>	<b>3,137,424</b>
<b>Deduct—</b>	
Exports April, 1934, to March, 1935 . . . . .	1,187,580
Home consumption . . . . .	328,560
<b>TOTAL . . . . .</b>	<b>1,516,140</b>
Balance of supply as on 1st April, 1935 . . . . .	1,621,284
At the same period during 1934 . . . . .	2,491,179
At the same period during 1933 . . . . .	2,486,408

### 4. Exports of Sugar.

Details showing destination of exports of Java sugar during the official year 1934-35 as compared with those for the two preceding years are given below :—

TABLE XX.I.—Exports of Sugar from Java during the Years 1932-33 to 1934-35.

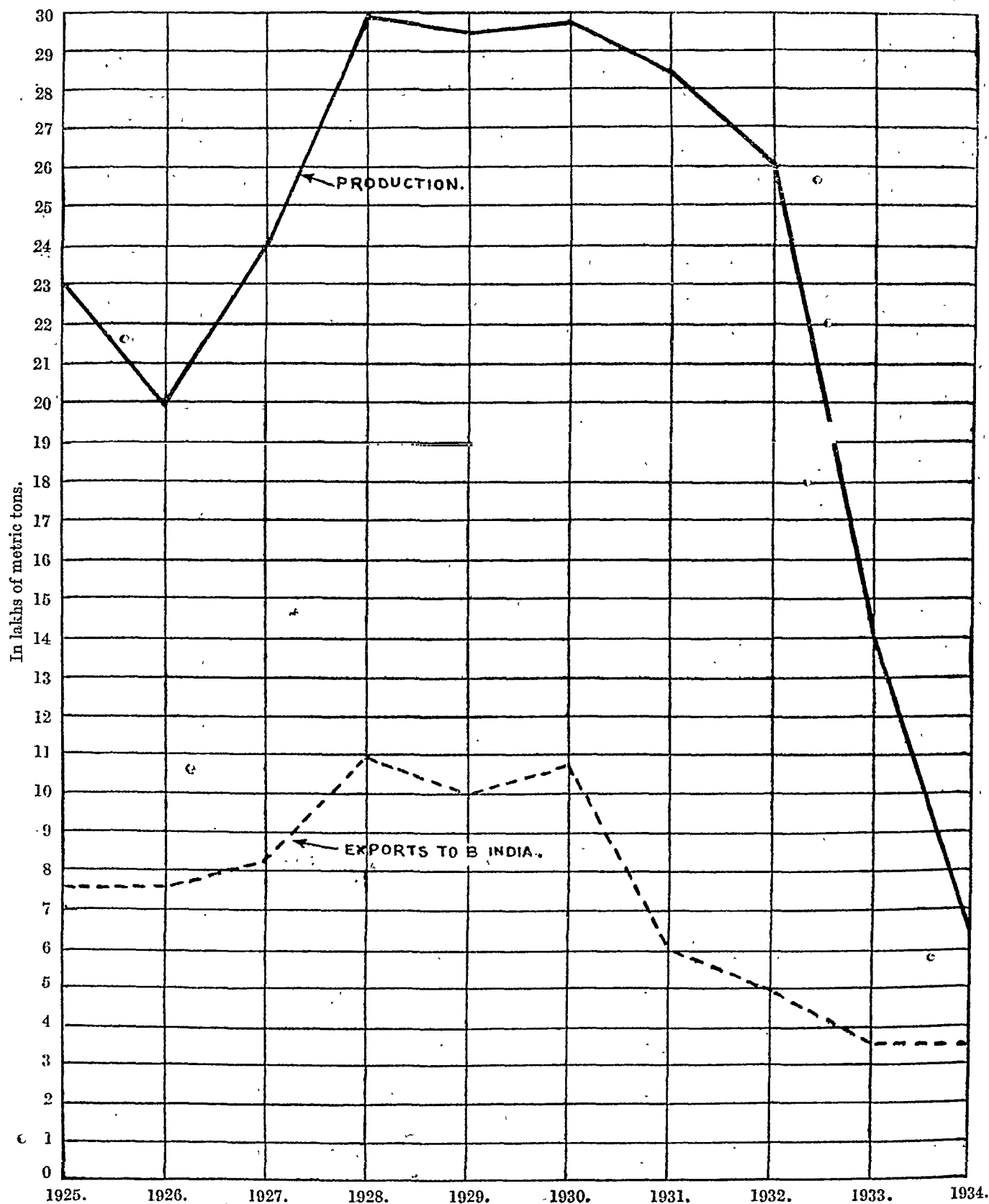
Destinations.	1934-35.	1933-34.	1932-33.
	<b>Tons.</b>	<b>Tons.</b>	<b>Tons.</b>
Holland . . . . .	24,386	17,559	2,159
England . . . . .	77,264	48,811	270,144
Germany . . . . .	162	2,714	418
France . . . . .	2,782	2,417	19,415
Belgium . . . . .	50	1,437	2,529
Port Said f.o. . . . .	30,618	62,053	36,719
Egypt . . . . .	583	3,048	288
Italy . . . . .	1,472	914	2,032
Denmark . . . . .	8,015	..	..
<b>TOTAL EUROPE . . . . .</b>	<b>145,332</b>	<b>138,953</b>	<b>333,704</b>
U. S. Atlantic Coast . . . . .	..	..	..
U. S. Pacific Coast . . . . .	252	818	1,817
<b>TOTAL AMERICA . . . . .</b>	<b>252</b>	<b>818</b>	<b>1,817</b>
Aden . . . . .	13,752	7,981	2,742
Africa . . . . .	5,716	5,829	6,365
Arabia . . . . .	2,277	1,510	899
Persia . . . . .	334	111	51
Singapore . . . . .	58,553	48,864	58,933
Penang . . . . .	24,321	20,911	17,475
British Malaya . . . . .	354	1,923	11,937
British India . . . . .	402,076	320,639	425,727
Siam . . . . .	30,580	29,442	33,181
Hongkong . . . . .	203,360	187,854	204,100
China . . . . .	78,113	83,312	91,022
Japan . . . . .	123,767	137,177	62,262
Formosa . . . . .	15,483	22,387	15,688
Korea . . . . .	11,509	20,011	4,002
Australia . . . . .	178	153	169
New Zealand . . . . .	62,232	70,338	46,487
Saigon . . . . .	1,470	2,969	1,161
Vladivostock . . . . .	5,592	..	11,092
Dairen . . . . .	558	3,440	130
Philippines . . . . .	..	..	34
Polynesia . . . . .	1,237	1,535	1,329
British North Borneo . . . . .	457	529	769
Portuguese Timor . . . . .	62	100	392
Others . . . . .	15	118	35
<b>TOTAL EASTERN . . . . .</b>	<b>1,041,996</b>	<b>967,133</b>	<b>995,952</b>
<b>GRAND TOTAL . . . . .</b>	<b>1,187,580</b>	<b>1,106,904</b>	<b>1,331,473</b>

For the period 1934-35 shipments to west of Suez were 145,584 tons as against 139,771 tons in the previous year. Shipments to British India totalled 402,076 tons in 1934-35 as against 320,639 tons and 425,727 tons in 1933-34 and 1932-33, respectively.

Shipments to Hongkong and China ports totalled 281,473 tons against 271,166 tons and 295,122 tons in 1933-34 and 1932-33, respectively.

Figures for the last 10 years relating to the production of sugar in Java and the exports of sugar from Java to British India are shown in the following graphs:—

GRAPH D.—SHOWING THE TOTAL PRODUCTION OF SUGAR IN JAVA AND THE EXPORTS OF SUGAR FROM JAVA TO BRITISH INDIA FROM 1925 TO 1934.





### 5. Future Outlook.

The sugar industry in Java has perhaps suffered more seriously than that of any other country due to the collapse of sugar values and the shrinkage of sugar markets during the period following 1929. The sugar industry in Cuba has also suffered severely but the Cubans had always their preferred position in the United States market as an assured outlet for a large part of their crop. Java had no such advantage. She was deprived of her once most lucrative markets in India and Japan by the development of domestic production in those countries. By force of circumstances Java is left with large stocks still on hand at a time when other exporting countries have largely or wholly eliminated their excess supplies.

To meet these discouraging conditions, Java sugar producers with the help of the Government are carrying through a drastic plan of crop curtailment and such other measures as are expected to preadjust the Island's sugar industry to present conditions. A definite programme had been chalked out covering a period of reconstruction extending to 1939. Plantings for next year's crop have been limited to an area estimated to produce 455,000 metric tons. With anticipated exports and domestic consumption of 1,400,000 tons during the coming year, it is expected that stocks on April 1st, 1936, will be reduced to 700,000 tons, and one year more of drastically restricted output will clear away these stocks.

The outturn of the mills in general will be held at 50 per cent of their rated capacity, with some special allowances for independently owned single mills. It is expected that the annual crop for Java will thus be reduced to about 1,500,000 tons which is the estimated quantity the Island can readily dispose of. Reserve factory capacity will be available in case conditions warrant an increase in output.

### XI.—REVIEW OF THE SUGAR TRADE OF CUBA.

The sugar trade in Cuba during the year 1934 was influenced chiefly by political events, such as reductions in the United States tariff rate and new legislation affecting sugar, the latter chiefly applying to the Jones-Costigan Bill which put sugar under the regulations of the Agricultural Adjustment Act. This law allowed the Secretary of Agriculture to put into operation a quota system involving Cuba, Porto Rico, Philippines, Hawaii and the Virgin Islands.

During January, the chief business in sugar was done in duty frees as Cuban holders expecting an important reduction in the United States rate of duty on Cuban sugar coming into the United States would not sell. The course of prices during January was :—

Opening	1-20c.
High	1-25c.
Low	1-16c.

made a basic commodity and suggesting that supplies for the United States consumption be put on a quota system and also intimating that a reduction in duty would be made to benefit Cuba. This had an unsettling effect on prices. Prices in February ranged :—

High	1-42c.
Low	1-25c.
Average	1-33c.

The market declined steadily during the month of March due to continued selling pressure of duty free sugars. The Sugar Bill was introduced into the United States Senate and House of Representatives during March. Prices during the month were :—

High	1-32c.
Low	0-95c.

April showed no change in the declining course of the market. Prices during the month were :—

High	0-95c.
Low	0-70c. per lb.

The Sugar Bill which was introduced into the United States Congress during March was signed by President Roosevelt on May 9, 1934. He also reduced the rate of duty on Cubas from 2-00c. a pound to 1-50c. a pound which would be effective after a period of 30 days, i.e., from 9th June, 1934. A moderate business took place in Cuban sugars to both operators and refiners but mostly above the parity of duty frees. A processing tax at 0-50c. a pound, was imposed on all refined sugar from any source marketed in the United States, the proceeds of which tax were to be distributed to both cane and beet farmers in the United States of America, and insular possessions. This tax also became effective at the same time as the change in duty. May prices of raws were :—

High	0-85c.
Low	0-75c.

During June Cuba continued to offer sugar only sparingly expecting further reduction in duty. The market on the sugar exchange was also influenced by the possibility of a further reduction in the Cuban duties and operators paid up to 1-52c. C. & F. for Cubas, which figured 3-02c. under the duty then in force of 1-50c. During this month quotas were assigned to Philippines, Porto Ricos, Hawaiians and Virgin Islands, by the Secretary of Agriculture under the powers given him in the Sugar Bill.

Quotations during July varied little, the high being 3-22c. duty paid and the low 3-15c. both including duty of 1-50c. basis for 96° Cubas. Cuban holders as a rule kept out of the market in view of the possible tariff reductions although occasionally refiners bought a cargo at about the existing price for duty frees. With the heavy buying of Porto Ricos by all refiners in the East and South the quota for that country was practically reached so refiners commenced to turn their attention towards Cuba,

the refiners paid up to 1.75c. per pound C. & F. which equals to 3.25c. duty paid for prompt shipments.

During July and August refiners occasionally bought Philippine sugars that were over quota with the expectation of storing same until they could be used in 1935. On August 24, 1934, the President signed a Trade Agreement with Cuba. The Cuban duty was reduced to 0.90c. a pound, 96° raws, which was effective on September 4, 1934. During the month of September, the Cuban price was maintained unchanged and very heavy sales took place in warehoused Cubas chiefly from New York and Norfolk. Naturally, with a large demand from refiners prices opening at 1.96c. C. & F. advanced towards the end of the month to 2.07c. C. & F. for Cubas.

During October a sale of 130,000 tons Cubas was made to refiners at 2.18½c. C. & F. During the early part of November the market reached 3.00c. duty paid after which it eased off, sales being made at end of November at 2.80c. duty paid.

On November 20, a cargo of Cubas for prompt shipment from Cuba for December use was sold at the fixed price of 2.18½c. C. & F. The market, as far as spot sugars were concerned, developed an irregular tone, sales at the end of November of such sugars being made at 2.80c., but during the first week of December they sold at 2.97½c. duty paid basis. These sales exhausted the available supply of Cubas in warehouse and the market was dependent on Cubas for shipment chiefly for January use at

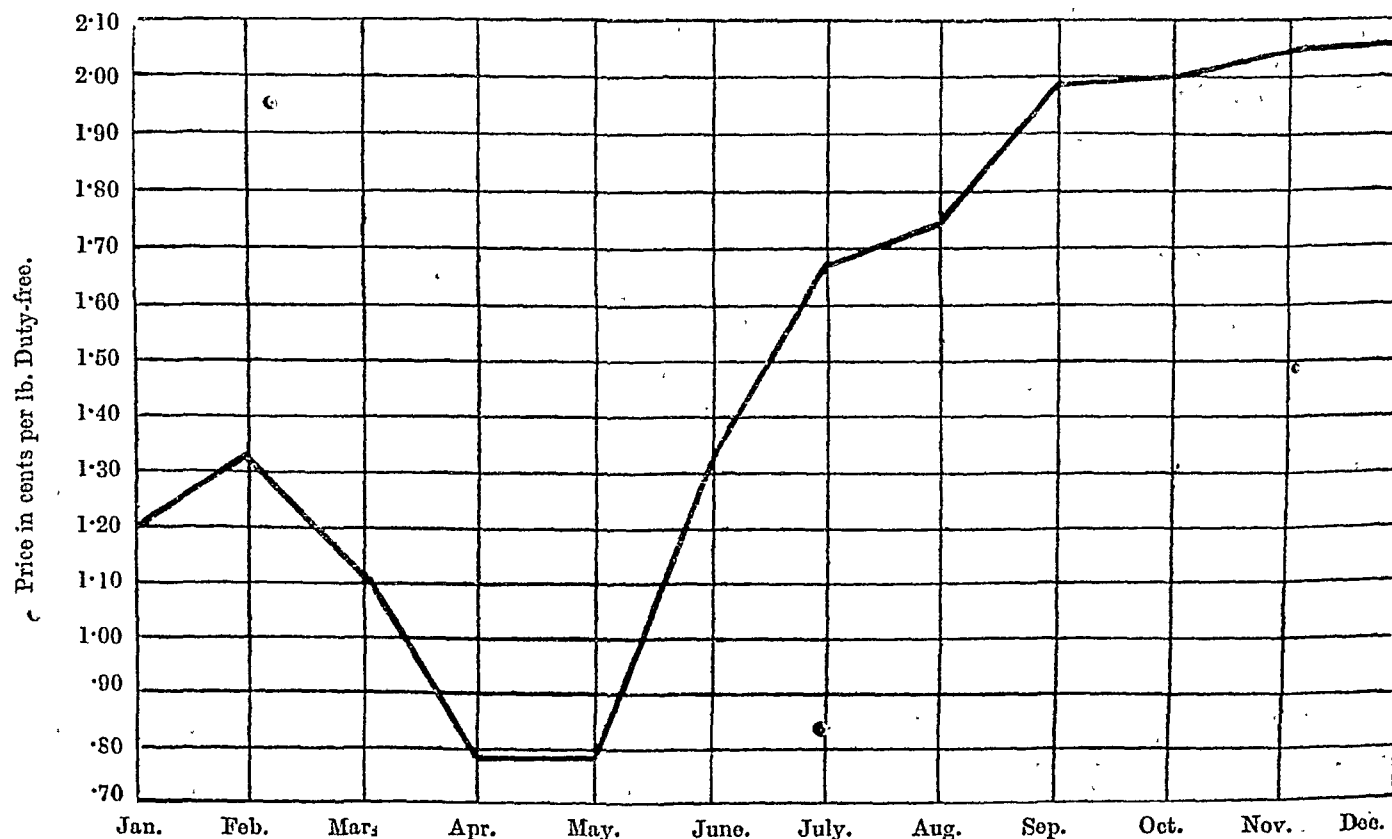
2.60c. duty paid. A large business was done with various refiners on these terms but some of the holders of Cuban sugar decided to warehouse rather than sell to refiners at this price.

On December 19th the Agricultural Adjustment Administration announced that the 1934 quota for imports of sugar from Cuba for consumption in the United States, amounting to 1,901,752 short tons raw value, had been reached. Any additional sugars arriving from Cuba into the United States during the remainder of the calendar year would be stored in bond. Refiners had shown little interest as buyers of Cubas and only a small quantity was purchased by a refiner in early arrival position at 1.70c. C. & F. The average price of raw sugar, cost and freight at New York for the month of January, 1935, was 1.89 cents per lb. as against 1.20 cents per lb. in the corresponding month last year. The average prices for raws during the months of February and March, 1935, were 1.99 cents and 2.13 cents, respectively.

The President of Cuba signed a decree on the 18th December, 1934, limiting the 1935 Cuban crop to 2,315,000 long tons. The quota for shipment to the United States was fixed at 1,456,519 tons and to countries outside the United States at 708,451 tons. The quota for local consumption was set at 150,000 tons.

Cuban exports of sugar during the calendar year 1934 totalled 2,344,917 long tons, raw value, as compared with 2,341,110 tons in 1933, an increase of 3,837 tons.

GRAPH E.—SHOWING THE MONTHLY AVERAGE SUGAR PRICES FOR RAWs, C. & F. NEW YORK DURING THE YEAR 1934.



The table below shows the production of sugar, the number of centrals operating in Cuba, and the consumption of sugar in the United States from 1926 to 1934 :—

TABLE XXIII.—*Sugar Production in Cuba from 1926 to 1934.*

Year.	Centrals operating.	Sugar produced (long tons, Raw Sugar).	United States Consumption (Refined Sugar value).	Percentage of Cuban Sugar entering United States' Consumption.
				Per cent
1926. . .	177	4,885,000	5,671,000	58
1927. . .	177	4,503,000	5,297,000	55
1928. . .	172	4,012,000	5,513,000	47
1929. . .	203	5,156,000	5,811,000	52
1930. . .	157	4,671,000	5,599,000	44
1931. . .	140	3,122,000	5,475,000	37
1932. . .	133	2,603,000	5,214,000	28
1933. . .	125	1,995,000	5,270,000	25
1934. . .	166	2,274,000	5,135,000	24

## XII.—A GENERAL SURVEY OF WORLD SUGAR POSITION IN THE YEAR 1934-35.

According to the latest estimate, the world production of sugar in 1934-35 totalled 21,901,000 metric tons as compared with 25,521,000 metric tons in the previous year. The production thus shows a decrease of 617,000 metric tons from the preceding year. The table below shows the production of sugar (beet and cane) in different countries for the years 1934-35 and 1933-34 :—

TABLE XXIV.—*Estimate of the World Sugar Production—Campaign Year September-August.*

—	Result 1934-35.	Result 1933-34.
<i>In 1,000 Metric Tons, Raw Sugar Value.</i>		
<b>A.—Beet Sugar.</b>		
<i>(a) Europe.</i>		
Germany . . . . .	1,673	1,428
Danzig . . . . .	33	26
Czechoslovakia . . . . .	638	517
Austria . . . . .	223	170
Hungary . . . . .	120	136

TABLE XXIV.—*Estimate of the World Sugar Production—Campaign Year September-August—contd.*

—	Result 1934-35.	Result 1933-34.
<i>In 1,000 Metric Tons, Raw Sugar Value.</i>		
<b>A.—Beet Sugar—contd.</b>		
<i>(a) Europe—contd.</i>		
France . . . . .	1,223	946
Belgium . . . . .	270	247
Netherlands . . . . .	243	290
Poland . . . . .	447	342
Denmark . . . . .	90	254
Sweden . . . . .	272	305
Italy . . . . .	345	300
Spain . . . . .	340	242
Jugoslavia . . . . .	63	74
Roumania . . . . .	107	145
Bulgaria . . . . .	2	45
Switzerland . . . . .	10	9
United Kingdom . . . . .	691	523
Irish Free State . . . . .	75	35
Finland . . . . .	12	7
Latvia . . . . .	61	33
Lithuania . . . . .	17	9
Turkey (European and Asiatic)	66	78
Azores . . . . .	3	3
Total Europe, Soviet excluded .	7,036	6,161
Soviet Union . . . . .	1,460	1,201
Total Europe . . . . .	8,496	7,368
<i>(b) America.</i>		
United States . . . . .	1,178	1,618
Canada . . . . .	57	66
Argentina . . . . .	3	4
Uruguay . . . . .	1	1
Total America . . . . .	1,239	1,719

TABLE XXIV.—*Estimate of the World Sugar Production—Campaign Year September-August—concl'd.*

	Result 1934-35.	Result 1933-34.
<i>In 1,000 Metric Tons, Raw Sugar Value.</i>		
<b>A.—Beet Sugar—concl'd.</b>		
(c) <i>Asia.</i>		
Japan (Hokkaido) . . . .	39	26
Manchuria . . . . .	4	4
Iran . . . . .	9	1
Total Asia . . . . .	52	31
(d) <i>Australia.</i>		
Victoria (Maffra) . . . .	6	6
Beet Sugar Production . .	9,793	9,124
<b>B.—Cane Sugar.</b>		
(a) <i>Europe.</i>		
Spain . . . . .	18	15
(b) <i>America.</i>		
Louisiana and Florida . .	250	232
Porto Rico . . . . .	708	1,010
Hawaii . . . . .	862	866
Virgin Islands . . . . .	2	5
Cuba . . . . .	2,611	2,340
Trinidad . . . . .	120	107
Barbados . . . . .	45	81
Jamaica . . . . .	76	74
Antigua, St. Kitts, St. Lucia and St. Vincent. . . . .	54	57
Martinique and Guadeloupe .	90	85
Dominican Republic and Haiti.	467	414
Mexico . . . . .	296	209
Guatemala, Costa Rica, Hondur- as, Nicaragua, San Salva- dor and Panama. . . . .	37	41
British Guiana . . . . .	134	144
Dutch Guiana . . . . .	18	18
Argentina . . . . .	342	316
Brazil . . . . .	975	969
Peru . . . . .	400	420
Venezuela, Colombia, Ecuador, Bolivia and Paraguay. . . .	81	93
Total America . . . . .	7,568	7,481

TABLE XXIV.—*Estimate of the World Sugar Production—Campaign Year September-August—concl'd.*

	Result 1934-35.	Result 1933-34.
<i>In 1,000 Metric Tons, Raw Sugar Value.</i>		
<b>B.—Cane Sugar—concl'd.</b>		
(c) <i>Asia.</i>		
British India . . . . .	3,120	3,106
Java . . . . .	703	1,504
Japanese Empire . . . . .	1,154	802
Philippine Islands . . . .	630	1,434
China, Indo-China and Siam .	275	264
Total Asia . . . . .	5,882	7,110
(d) <i>Africa.</i>		
Egypt . . . . .	137	154
Mauritius . . . . .	183	265
Reunion . . . . .	64	77
South African Union . . . .	325	355
Mozambique . . . . .	82	68
Angola, Madeira, Madagascar, Kenya, Uganda, Somaliland, Belgium Congo and Cape Verde. . . . .	86	77
Total Africa . . . . .	877	996
(e) <i>Australia.</i>		
Queensland and New South Wales. . . . .	651	677
Fiji Islands . . . . .	115	118
Total Australia . . . . .	766	795
Cane Sugar Production . .	15,111	16,397
World Sugar Production . .	24,904	25,521

It will be observed from the above table that the production of Beet sugar increased from 9,124,000 metric tons in 1933-34 to 9,793,000 metric tons in 1934-35 or an increase of 669,000 metric tons over last year. The production of Cane sugar, on the other hand, decreased from 16,397,000 metric tons in 1933-34 to 15,111,000 metric tons in 1934-35 or a decrease of 1,286,000 metric tons from last year. Another table is given below showing the world figures of consumption, imports and exports of sugar in the year 1934-35 as compared with the figures for the previous year. It will be observed that the consumption in the year 1934-35 exceeded the consumption in the previous year by 600,000 metric tons and the import figure increased by 111,000 metric tons in 1934-35 over last year. The export of sugar during the year 1934-35 showed a decline of 929,000 metric tons from the preceding year.

TABLE XXV.—Consumption, Imports and Exports of Sugar in the World.

	Consumption.		Imports.		Exports.	
	1934-35.	1933-34.	1934-35.	1933-34.	1934-35.	1933-34.
<i>In 1,000 Metric Tons, Raw Sugar Value.</i>						
<i>Europe—</i>						
Germany . . . . .	1,576	1,630	21	17	2	5
Czechoslovakia . . . . .	409	401	..	..	222	166
Austria . . . . .	169	175	7	4	..	..
Hungary . . . . .	96	93	..	..	25	53
Switzerland . . . . .	180	195	172	188	1	2
France . . . . .	1,081	1,045	403	426	325	298
Belgium . . . . .	235	229	94	114	108	132
Netherlands . . . . .	303	305	131	98	64	77
United Kingdom . . . . .	2,283	2,244	1,993	2,136	335	406
Poland . . . . .	335	324	..	..	111	93
Soviet Union (c) . . . . .	(a) 1,380	(a) 1,160	(a) ..	13	(a) 84	49
Denmark . . . . .	196	204	66	1	1	16
Sweden . . . . .	232	232	5	11	..	..
Italy . . . . .	328	325	8	6	9	8
Spain . . . . .	300	302	..	..	..	..
Other Countries . . . . .	813	845	395	465	16	25
Total Europe (c) . . . . .	9,966	9,659	3,295	3,477	1,303	1,330
<i>Asia—</i>						
China and Hongkong (b) . . . . .	(a) 580	595	(a) 350	375	..	..
British India (d) . . . . .	(a) 3,350	3,372	280	325	(a) 48	55
Japanese Empire (b) . . . . .	(a) 1,045	975	(a) 155	117	(a) 230	167
Java . . . . .	334	353	..	..	1,254	1,170
Philippine Islands (e) . . . . .	(a) 65	70	..	..	(a) 475	1,369
Other Countries (b) . . . . .	(a) 533	512	(a) 526	480	(a) 61	17
Total Asia . . . . .	5,907	5,877	1,311	1,297	2,058	2,778
<i>Africa—</i>						
Egypt . . . . .	137	127	(a) 5	1	(a) 68	59
South African Union . . . . .	200	181	1	1	110	173
Mauritius . . . . .	(a) 11	11	..	..	(a) 170	255
Other Countries (b) . . . . .	(a) 399	401	(a) 371	369	(a) 219	177
Total Africa . . . . .	747	720	377	371	567	664
<i>America—</i>						
United States . . . . .	5,870	5,699	2,778	2,508	153	64
Hawaii . . . . .	22	22				
Porto Rico, Virgin Islands . . . . .	60	60	..	..	..	..
Cuba (b) . . . . .	(a) 150	150	..	..	(a) 2,350	2,529
Canada, Newfoundland (b) . . . . .	(a) 460	461	(a) 398	401	(a) 1	5
British West Indies, Guiana (b) . . . . .	(a) 47	48	3	3	(a) 393	424
French West Indies (b) . . . . .	(a) 5	5	..	..	(a) 85	79
Dominican Republic, Haiti (b) . . . . .	(a) 34	34	..	..	(a) 423	356
Mexico . . . . .	267	240	..	13	..	..
Central America (b) . . . . .	(a) 45	47	(a) 4	2	(a) 4	2
Argentina (f) . . . . .	366	342	1	..	2	3
Brazil . . . . .	(a) 935	(a) 935	..	..	(a) (b) 65	(b) 24
Peru (f) . . . . .	66	66	..	..	318	367
Other Countries in South America (b) . . . . .	(a) 245	250	(a) 171	164	(a) 21	27
Total America . . . . .	8,572	8,359	3,355	3,091	3,815	3,880

(a) Estimated.

(b) Calendar years 1935, resp. 1934.

(c) The Asiatic territory of the Soviet Union and Turkey included.

(d) Inasmuch as figures for *gur* appear in the Indian statistics, they were converted into raw sugar value according to the rate 100 : 60; the figures for previous years were adjusted accordingly.

(e) Muscovados consumed in the Philippine Islands not included.

(f) Sugar of all grades; calendar years 1934, resp. 1933.

TABLE XXV.—Consumption, Imports and Exports of Sugar in the World—contd.

	Consumption.		Imports.		Exports.	
	1934-35.	1933-34.	1934-35.	1933-34.	1934-35.	1933-34.
	<i>In 1,000 Metric Tons, Raw Sugar Value.</i>					
<i>Australia—</i>						
Continent	357	343			(a) 300	(b) 339
Oceania (b)	(a) 88	79	(a) 84	75	(a) 132	113
Total Australia	445	422	84	75	432	452
WORLD	25,637	25,037	8,422	8,311	8,175	9,104

(a) Estimated.

(b) Calendar years 1935, resp. 1934.

The following table shows the production and consumption of sugar (cane and beet) and the excess of production over consumption from 1925-26 to 1934-35 :—

TABLE XXVI.—World Production and Consumption of Sugar (Cane and Beet).

Year.	Production.	Consumption.	Excess of Production over Consumption.
	Metric Tons.	Metric Tons.	Metric Tons.
1925-26 . . .	25,923,000	24,712,000	1,211,000
1926-27 . . .	24,859,000	24,796,000	69,000
1927-28 . . .	26,033,000	25,843,000	790,000
1928-29 . . .	28,898,000	27,479,000	1,419,000
1929-30 . . .	28,555,000	26,846,000	1,709,000
1930-31 . . .	29,579,000	26,939,000	2,640,000
1931-32 . . .	27,208,000	26,100,000	1,108,000
1932-33 . . .	25,719,000	25,876,000	—157,000
1933-34 . . .	25,521,000	25,037,000	484,000
1934-35 . . .	24,904,000	25,637,000	—733,000

NOTE.—The figures have been revised according to the latest available estimate.

It is satisfactory to note that consumption in the year 1934-35 exceeded the production by 733,000 metric tons.

### XIII.—CONCLUSION.

The production of sugar directly from cane in modern factories in India has continued its course

of expansion and attained a record figure during the year under review, in spite of the fact that the cane crop was damaged in certain areas. The production of sugar from *gur* remained almost stationary whilst that by the *Khandsari* process registered a further decline.

The current cane season 1935-36 has been exceptionally favourable to millers. The acreage under cane is larger than in any previous year, the increase in the United Provinces (which contains approximately 56 per cent of the total Indian cane acreage and accounts for 55 per cent of the total Indian production of factory-made sugar) being 22 per cent over last year's acreage. At the same time the crop is generally healthier than in the previous year, whilst well-distributed winter rains have provided the necessary humidity to enable the crop to remain in the fields till late in the season. As a result of the larger cane crop, *gur* prices have declined and a larger quantity is expected to be refined this year.

The effect of these all-round favourable conditions has been an increase in the total production of sugar which is estimated at approximately 106,000 tons above the previous year's production. A forecast of sugar production is given in Table XXVII. It should be noted that the estimates of production of sugar from cane are for each cane season which lasts from November to May in Northern India.

TABLE XXVII.—Forecast of Total Annual Production of Sugar (excluding Gur) in India from Cane Factories, Gur Refineries and Khandsari Concerns up to 1936-37.

Particulars.	1934-35 (Actual).*	1935-36 (Esti- mated).	1936-37 (Esti- mated).
	Tons.	Tons.	Tons.
1. Production from existing capacity of old cane factories.†	678,000	578,000	634,000
2. Production due to increase in capacity of old cane factories.†	..	91,000	70,000
3. Production from new cane factories commencing manufacturing operations during the season.	..	15,000	10,000
4. Production of sugar from gur‡	40,000	40,000	40,000
5. Total production of factory sugar	618,000	724,000	804,000
6. Estimated production of Khandsari sugar.	150,000	125,000	100,000
7. Total production of all kinds of sugar (excluding gur).	768,000	849,000	904,000

\* Production of sugar from cane is actual and shown in round figures. Production of sugar from gur is estimated.

† Under "Old factories" are included all factories excepting those commencing manufacturing operations for the first time during the season.

‡ Production of sugar from gur is estimated for the calendar years 1935, 1936 and 1937.

The present season has been noteworthy for disturbed market conditions. High opening prices and a strong market were followed within the short space of a few weeks by a sharp decline and an almost complete disappearance of demand. It is not necessary to enter here into details of the causes which have contributed to this collapse. It is, however, generally recognised now that the present situation has brought into prominence the weakness of the existing marketing organization for sugar in India. It has, in particular, emphasized the necessity firstly, for a more uniform and generally agreed basis for grading of sugar (in place of the present system under which sugars produced by different manufacturers and said to be of the same grade are, in fact, of widely different qualities), and secondly for the adoption of terms of sales contracts which would take equal account of the needs of the manufacturer and the merchant. Attention to these vital details would benefit the manufacturer more than anyone else, as it would enable him to get the best value for his products.

CAWNPORE ;

19th February, 1936.

### LIST "A".

#### List of Modern Sugar Factories and Refineries existing in India in the year 1934-35.

Serial No. and Name and Address of Firm.	District.	Location.	Nearest Railway Station.	Capacity. Tons.
<b>I.—Factories working with Cane.</b>				
<b>Punjab.</b>				
1. The Phulerwan Sugar & Oil Mills, Ltd., Phulerwan.	Sargodha	Phulerwan	Phulerwan, N. W. R.	100
2. The Bhalwal Sugar Mills Co., Ltd. (Managing Agents—Captain Malik Sardar Khan Noon, Rais, Tahsil Bhalwal.)	Shahpur	Bhalwal	Bhalwal, N. W. R.	100
3. The Gujranwala Sugar Mills. (Managing Agents—Messrs. Singh & Co., Ltd., Circular Road, Gujranwala, Punjab.)	Gujranwala	Rahwali	Rahwali, N. W. R.	300
4. The Punjab Nations (Managing Agent—pur.)	Lyallpur	Lyallpur	Lyallpur Jn., N. W. R.	70
5. The Arya Sugar Mills, Dinanagar. (Proprietors—Ganga Bishon, Dev Raj, Dinanagar.)	Gurdaspur	Dinanagar	Dinanagar	100
6. The Saraswati Sugar Mills. (Managing Agent—Mr. F. A. Sherwani, Neoli, P. O. Soron, Dist. Etah.)	Ambala	Jagadhri	Jagadhri, N. W. R.	400
*7. The Punjab Sugar Corporation Ltd., Sonapat—near Delhi. (Managing Agents—The Ganesh Flour Mills Co., Lyallpur and Delhi.)	Rohtak	Sonapat	Sonapat, N. W. R.	300

\* These factories have also refining plants.

## LIST "A"—contd.

## List of Modern Sugar Factories and Refineries existing in India in the year 1934-35—contd.

Serial No. and Name and Address of Firm.	District.	Location.	Nearest Railway Station.	Capacity. Tons.
<b>I.—Factories working with Cane—contd.</b>				
<b>United Provinces.</b>				
1. Jai Lakshmi Sugar Co., Ltd., Doiwala. (Managing Director—Jishnu Lal, Esq., B.Sc., Doiwala.)	Dehra Dun	Doiwala	Doiwala, E. I. R.	250
2. The Ganga Sugar Corporation, Ltd. (Managing Agents—The Ganga Sugar Corporation, Ltd., College Road, Rawalpindi.)	Saharanpur	Deoband	Deoband, N. W. R.	600
3. The Amritsar Sugar Mills Co., Ltd., P. O. Bahori. (Managing Director—Sardar Amar Singh Sahib, Amritsar.)	Muzaffarnagar	Rohana Kalan	Rohana Kalan, N. W. R.	600—800
*4. The Upper Doab Sugar Mills, Ltd. (Managing Agents—Hari Raj Swarup, Rajendra Lal and Lala Debi Prasad, Muzaffarnagar.)	Do.	Shamli	Shamli, S. S. R.	600—800
5. The Upper Jumna Swadeshi Sugar Mills Co., Ltd., Mansurpur. (Managing Agents—Messrs. Hari Raj Swarup, Rajendra Lal and Bros., Muzaffarnagar.)	Do.	Mansurpur	Mansurpur, N. W. R.	600
6. Upper India Sugar Mills, Ltd., Khatauli. (Managing Agents—Messrs. Mitra Mandal, Khatauli.)	Do.	Khatauli	Khatauli, N. W. R.	500
7. Bhogpur Sugar Factory, Bhogpur, P. O. Najibabad, E. I. R. (Proprietors—Raja Hari Kishan Kaul, 29, Lawrence Road, Lahore, and Ishwar Das Lakshmidas, Hughes Road, Bombay.)	Bijnor	Bhogpur	Najibabad, E. I. R.	50
8. The Dhampur Sugar Mills, Ltd. (Managing Director—Sahu Ram Swarup, Dhampur.)	Do.	Dhampur	Dhampur, E. I. R.	450—500
9. The Upper Ganges Sugar Mills, Ltd. (Managing Agents—Messrs. Birla Brothers, Ltd., 8, Royal Exchange Place, Calcutta.)	Do.	Seohara	Seohara, E. I. R.	1,100
10. Seth Shiv Prasad Bansidas Sugar Mills, Bijnor. (Proprietors—Messrs. Shiv Prasad Banarsidas Agrawal, Bankers and Mill Owners, 85, Lake Road, Lahore.)	Do.	Bijnor	Bijnor, E. I. R.	400
11. Rai Bahadur Narain Singh Sugar Mills, Ltd., Baraut. (Managing Director—Sardar Ranjit Singh, 2-A, Curzon Road, New Delhi.)	Meerut	Baraut	Baraut, S. S. R.	600—750
*12. The Diwan Sugar Mills, Sakhoti Tanda, P. O. Sakhoti Tanda. (Proprietor—Seth Dhanpatmal Diwan Chand, Lyallpur.)	Do.	Sakhoti Tanda	Sakhoti Tanda	400—500
*13. Daurala Sugar Works, Daurala. (Proprietors—The Delhi Cloth and General Mills Co., Ltd., Delhi.)	Do.	Daurala	Daurala, N. W. R.	900
*14. Jaswant Sugar Mills, Meerut. (Proprietor—Lala Jaswant Rai, M.A., Meerut.)	Do.	Maliana	Meerut City, N. W. R.	300
*15. Ram Lakshman Sugar Mills. (Proprietors—Messrs. Dina Nath Nainchand and Rao Bahadur Seth Lachman Das & Sons.)	Do.	Mohiuddinpur	Mohiuddinpur, N. W. R.	400
16. Modi Sugar Mills, Ltd. (Managing Agents—Messrs. Multani Mal & Sons, Patiala.)	Do.	Begamabad	Begamabad, N. W. R.	500
*17. Simbhaoli Sugar Mills. (Managing Proprietor—Sardar Raghubir Singh Sendhanwalia, O.B.E., P. O. Baksar, Dist. Meerut.)	Do.	Simbhaoli	Simbhaoli, E. I. R.	400
18. The Muradnagar Sugar Works, P. O. Muradnagar. (Proprietor—Bal Kishendas, Raghuvir Shalla, Bharatpur.)	Do.	Muradnagar	Muradnagar, N. W. R.	50
*19. Prag Sugar Works, Kichha. (Managing Agent—Prag Narain, Vakil, Rawatpara, Agra.)	Nainital	Kichha	Kichha, R. K. R.	800

\* These factories have also refining plants.



LIST "A"—*contd.*List of Modern Sugar Factories and Refineries existing in India in the year 1934-35—*contd.*

Serial No. and Name and Address of Firm.	District.	Location.	Nearest Railway Station.	Capacity.
				Tons.
<b>I.—Factories working with Cane—<i>contd.</i></b>				
<b>United Provinces—<i>contd.</i></b>				
*20. Khandke Sugar Mills, Ltd., Baheri. (Managing Agents—Messrs. D. N. Khandke & Co., Baheri, Dist., Bareilly.)	Bareilly	Baheri	Baheri, R. K. R.	150
21. The Kesar Sugar Works, Ltd., Baheri. (Managing Agents—Messrs. Kilachand Devchand & Co., Allahabad Bank Building, Appollo Street, Fort, Bombay, P. O. Box No. 746.)	Do.	Do.	Do.	800
22. H. R. Sugar Factory, Nekpur. (Managing Director—Raja Radha Raman.)	Do.	Nekpur	Bareilly, R. K. R.	600
23. Neoli Sugar Factory. (Proprietor—F. A. Sherwani, P. O. Soron, Dist. Etah.)	Etah	Manpur Nagaria	Manpur Nagaria, R. K. R.	50–600
24. L. H. Sugar Factories and Oil Mill, Ltd., Pilibhit. (Managing Director—Sahu Jagdish Prasad Jee Sahib, Pilibhit.)	Pilibhit	Pilibhit	Pilibhit, R. K. R.	700
25. L. H. Sugar Factories and Oil Mill, Ltd., Pilibhit. (Managing Director—Sahu Jagdish Prasad Jee Sahib, Pilibhit.)	Do.	Do.	Do.	200
26. L. H. Sugar Factories and Oil Mill, Ltd., Pilibhit. (Managing Director—Sahu Jagdish Prasad Jee Sahib, Pilibhit.)	Do.	Do.	Do.	700
*27. The Hindustan Sugar Mills, Ltd., Gola Gokranmath. (Managing Agents—Messrs. Bachraj & Co., Ltd., 395, Kalba Devi Road, Bombay.)	Kheri	Gola Gokranmath.	Gola Gokranmath, R. K. R.	1,000
28. The Aira Sugar Factory, P. O. Aira Estate, Khamaria. (Managing Agent—Babu Shyam Mohan, Lakhimpur.)	Do.	Khamaria	Lakhimpur, R. K. R.	150
*29. Rosa Sugar Works and Distillery, Rosa. (Managing Agents—Lynn Marshall & Co., 4, Fairlie Place, Calcutta.)	Shahjahanpur	Rosa	Rosa, E. I. R.	600
30. The Oudh Sugar Mills, Ltd. (Managing Agents—Messrs. Birla Brothers, Ltd., Jahangir Wadia Buildings, Esplanade Road, Fort, Bombay.)	Sitapur	Hargaon	Hargaon, R. K. R.	1,000–1,200
*31. The Lakshmi Sugar Mills Co., Maholi. (Proprietors—Seth Ram Rattan and Seth Kishori Lal, Maholi, Dist. Sitapur.)	Do.	Maholi	Maholi, E. I. R.	400
32. The United Provinces Co-operative Sugar Factory, Ltd., Biswan. (Resident Director—The Hon'ble Rai Bahadur Lala Mathura Prasad Mehrotra, Biswan.)	Do.	Biswan	Biswan, R. K. R.	300
33. Seth Gulzarimall Ramchand Sugar Mills, Jarwal Road. (Proprietors—Lala Jaswant Rai & Sons, Karachi, and Messrs. Gulzarimall Ramchand, Bankers, Lahore.)	Bahraich	Jarwal Road	Jarwal Road, B. N. W.	400
*34. The Burhwal Sugar Mills Co., Ltd., Burhwal Head Office, Collectorganj, Cawnpore.	Barabanki	Burhwal	Burhwal, E. I. R. & B. N. W.	200
*35. The Lucknow Sugar Works, Ltd., Aishbagh, Lucknow.	Lucknow	Lucknow	Aishbagh, B. N. W.	400
*36. Experimental Sugar Factory of the Harcourt Butler Technological Institute, Cawnpore.	Cawnpore	Nawabganj	Rawatpur, Cawnpore, B. B. & C. I.	..
37. The Balrampur Sugar Co., Ltd. (Managing Agents—Messrs. Begg Sutherland & Co., Ltd., Cawnpore.)	Gonda	Balrampur	Balrampur, B. N. W. R.	700

\* These factories have also refining plants.

## LIST "A"—contd.

## List of Modern Sugar Factories and Refineries existing in India in the year 1934-35—contd.

Serial No. and Name and Address of Firm.	District.	Location.	Nearest Railway Station.	Capacity. Tons.
<b>I.—Factories working with Cane—</b> contd.				
<b>United Provinces—contd.</b>				
38. The Nawabganj Sugar Mills Co., Ltd., Nawabganj. (Managing Agents—Messrs. Narang Brothers & Co., Ltd., 3, Montgomery Road, Lahore.)	Gonda	Nawabganj	Nawabganj, B. N. W. R.	1,100
39. The Lakarmandi Sugar Mills Co., Ltd., Lakarmandi. (Director—The Lakarmandi Sugar Mills Co., Ltd., Nawabganj, Dist. Gonda.)	Do.	Lakarmandi	Katra, B. N. W. R.	100
*40. The Seksaria Sugar Mills, Ltd., Babhnan. (Managing Agents—Messrs. Govind Ram Ramnath & Co., 18, Mullick Street, Calcutta.)	Basti	Babhnan	Babhnan, B. N. W.	500
41. The Basti Sugar Mills Co., Ltd., Walterganj. (Managing Agents—Messrs. Narang Bros. & Co., Ltd., 3, Montgomery Road, Lahore.)	Do.	Walterganj	Walterganj, B. N. W.	550—600
*42. The Basti Sugar Mills Co., Ltd., Basti. (Managing Agents—Messrs. Narang Bros. & Co., Ltd., 3, Montgomery Road, Lahore.)	Do.	Basti	Basti, B. N. W.	550
43. Madho Kanhaya Mahesh Gauri Sugar Mills, Ltd., Jagdishpur, P. O. Munderwa.	Do.	Jagdishpur	Munderwa, B. N. W.	400—500
44. The Popular Sugar Co., Ltd., Barhni (Ramdatganj). (Managing Agents—Seth Nadhan Singh & Sons, Gujranwala, Punjab.)	Do.	Barhni	Barhni, B. N. W. R.	650
45. The Ganesh Sugar Mills, Ltd., Pharenda. (Managing Agents—Messrs. Poddar Jaipuria & Co., Jaipuria House, P. O. Beadon Street, Calcutta.)	Gorakhpur	Pharenda	Pharenda, B. N. W.	550—600
46. The Lakshmi Devi Sugar Mills, Ltd., Chitauni. (Managing Agents—Messrs. Agarwal & Co., Post Office Chitauni, Dist. Gorakhpur.)	Do.	Chitauni	Chitauni, B. N. W.	400
47. The Vishnu Pratap Sugar Works, Ltd., Khadda.	Do.	Khadda	Khadda, B. N. W.	400
48. The Ledi Sugar Factory, Ledi, P. O. Nichloul. (Managing Lessee—Dr. K. K. Bhargava, Ledi, P. O. Nichloul, Dist. Gorakhpur.)	Do.	Ledi	Siswa Bazar, B. N. W.	75
49. The Mahabir Sugar Mills, Ltd., Siswa Bazar. (Managing Agents—Messrs. Dwarkadas Baijnath, Siswa Bazar, Dist. Gorakhpur.)	Do.	Siswa Bazar	Do.	400
*50. The Punjab Sugar Mills Co., Ltd., Ghughli. (Chairman—Hon'ble Sir G. C. Narang, 5, Montgomery Road, Lahore.)	Do.	Ghughli	Ghughli, B. N. W.	500
51. The Shankar Sugar Mills, P. O. Captainganj. (Managing Agents—Messrs. Indra Chand Hari Ram, Captainganj.)	Do.	Captainganj	Captainganj, B. N. W.	600
52. The Diamond Sugar Mills, Ltd., Pipraich. (Managing Agents—Messrs. Murarka & Sons, Ltd., 10, Clive Row, Calcutta.)	Do.	Pipraich	Pipraich, B. N. W.	400
53. The Pipraich Sugar Mills, Ltd., Pipraich	Do.	Do.	Do.	250
*54. Saraya Sugar Factory, Sardarnagar. (Proprietor—Sardar Bahadur Sir Sunder Singh Majithia, Kt., C.I.E., P. O. Sardarnagar, Dist. Gorakhpur.)	Do.	Sardarnagar	Sardarnagar, B. N. W.	2,000
*55. Cawnpore Sugar Works, Ltd., Gauri Bazar. (Managing Agents—Messrs. Begg Sutherland & Co., Ltd., Cawnpore.)	Do.	Gauri Bazar	Gauri Bazar, B. N. W.	345

\* These factories have also refining plants.

## LIST "A"—contd. List of Modern Sugar Factories and Refineries existing in India in the year 1934-35—contd.

Serial No. and Name and Address of Firm.

### I.—Factories working with Cane— contd.

#### United Provinces—concl'd.

56. Shree Sitaram Sugar Co., Ltd., Baitalpur, P. O. Deoria. (Managing Agents—Messrs. Karmachand Thapar & Bros., Ltd., 5, Royal Exchange Place, Calcutta.)
- \*57. Hanumat Sugar Mills, Deoria, P. O. Deoria. (Proprietors—Messrs. Lakshmi Narain Mathura Prasad, Bankers and Cloth Merchants, Tahsil Deoria, and Others.)
- \*58. Noori Sugar Works, Bhatni. (Proprietors—Sheikh Khoda Buksh and others.)
- \*59. Ishwari Khetan Sugar Mills, Ltd., Lakshmiganj. (Managing Agents—Messrs. Devi Dutt Suraj Mull, P. O. Lakshmiganj, Dist. Gorakhpur.)
60. Maheshwari Khetan Sugar Mills, Ltd., Ramkola. (Managing Agents—Messrs. Devi Dutt Chaturbhuj, Ramkola.)
61. The Ramkola Sugar Mills Co., Ramkola.
- \*62. Padrauna Raj Krishna Sugar Works, Ltd., Padrauna. (Owned by the Padrauna Raj, Padrauna.)
63. The Jagdish Sugar Mills, Ltd. (Managing Agents—Raja Bahadur Brij Narain Singh & Co., Padrauna.)
- \*64. The United Provinces Sugar Factory, P. O. Seorahi. (Managing Agents—Messrs. James Finlay & Co., Ltd., 1, Clive Street, Calcutta.)
65. The Campierganj Sugar Mills, Ltd., Campierganj. (Managing Director—H. M. Nisarullah, B.A., M.L.C., Rais Quazipore Khurd, Gorakhpur.)
66. Purtabpore Sugar Factory. (Managing Agents—Messrs. Begg Sutherland & Co., Ltd., Cawnpore.)
- \*67. The Ratna Sugar Mills Co., Ltd., Shahganj. (Managing Agents—Messrs. Kashi Prasad & Co., Benares Cantonment.)
- \*68. The Shree Krishna Deshi Sugar Works, Jhusi, Dist. Allahabad. (Proprietors—Messrs. Kishori Lal Mukand Lal, G. Shibu Thakur Lane, Calcutta.)
- \*69. Tribeni Desi Sugar Works, Naini. (Proprietor—Lala Kanhaiya Lal, Allahabad.)

#### Bihar and Orissa.

1. Harinagar Sugar Mills, Ltd., Ramnagar. (Managing Agents—Narayanlal Bansilal, 207, Kalba Devi Road, Bombay 2.)
2. New Swadeshi Sugar Mills, Ltd., Narkatiaganj. (Managing Agents—Messrs. Birla Bros., Ltd., Jahangirwadia Buildings, 2nd Floor, Esplanade Road, Fort, Bombay.)
3. Pura Sugar Factory, Pura, P. O. Lauriya. (Proprietors—Pura, Ltd., P. O. Lauriya, Dist. Champaran.)

District.	Location.	Nearest Railway Station.	Capacity. Tons.
Gorakhpur.	Baitalpur.	Baitalpur, B. N. W.	500
Do.	Tahsil Deoria.	Tahsil Deoria, B. N. W.	100
Do.	Bhatni.	Bhatni, B. N. W.	500—600
Do.	Lakshmiganj.	Lakshmiganj, B. N. W.	650—700
Do.	Ramkola.	Ramkola, B. N. W.	600
Do.	Do.	Do.	600
Do.	Padrauna.	Padrauna, B. N. W.	882
Do.	Kathkuiyan.	Kathkuiyan, B. N. W.	400
Do.	Bubnowlie.	Tamkahi Road, B. N. W.	750
Do.	Campierganj.	Campierganj, B. N. W.	150
Do.	Chapra Dubauli.	Mairwa, B. N. W.	650
Jaunpur.	Shahganj.	Shahganj, E. I. R.	500
Allahabad.	Jhusi.	Jhusi, E. I. R.	400
Do.	Naini.	Naini, E. I. R. and G. I. P.	200
Champaran.	Ramnagar.	Harinagar, B. N. W.	800—1,000
Do.	Narkatiaganj.	Narkatiaganj, B. N. W.	750
Do.	Pakri.	Chanpatia, B. N. W.	425

\* These factories have also refining plants.

## LIST "A"—contd.

## List of Modern Sugar Factories and Refineries existing in India in the year 1934-35—contd.

Serial No. and Name and Address of Firm.	District.	Location.	Nearest Railway Station.	Capacity. Tons.
<b>I.—Factories working with Cane—</b> contd.				
<b>Bihar and Orissa—contd.</b>				
4. Chanpatia Factory of the Champaran Sugar Co., Ltd., Chanpatia. (Managing Agents—Messrs. Begg Sutherland & Co., Ltd., P. O. Box No. 21, Cawnpore.)	Champaran	Chanpatia	Chanpatia, B. N. W.	850
5. Motilal Padampat Sugar Mills Co., Ltd., Majhowlia. (Managing Agent—Messrs. Kamlapat Motilal, Cawnpore.)	Do.	Majhowlia	Majhowlia, B. N. W.	450
6. Sagauli Sugar Factory, Sagauli. (Managing Agent—Mohamad Hanif Amjad Ali, No. 5, Raj Mohan Street, Calcutta.)	Do.	Sagauli	Sagauli, B. N. W.	500
*7. Shree Hanuman Sugar Mills, Ltd., Motihari. (Managing Agents—Messrs. Daulat Ram Rawat Mull, 178, Harrison Road, Calcutta.)	Do.	Motihari	Motihari, B. N. W.	700
*8. Barrah Sugar Factory of the Champaran Sugar Co., Ltd., Barrah Chakia. (Managing Agents—Messrs. Begg Sutherland & Co., Ltd., P. O. Box No. 21, Cawnpore.)	Do.	Barrah Chakia	Chakia, B. N. W.	925
*9. Sasa Musa Sugar Works, Ltd., Sasa Musa. (Managing Agents—Messrs. Marsell & Co., Ltd., 9/12, Lall Bazar, Calcutta.)	Saran	Sasa Musa	Sasa Musa, B. N. W.	450
10. Vishnu Sugar Mills, Ltd., Harkhua, P. O. Gopalganj. (Managing Agents—Messrs. Bilas Rai Banarsi Lal & Co., Aga Khan Building, Dalal Street, Fort, Bombay.)	Do.	Harkhua	Harkhua, B. N. W.	450
*11. Shree Krishna Gyanoday Sugar Mills, Hathwa.	Do.	Mirganj	Hathwa, B. N. W.	800
*12. New Savan Sugar and Gur Refining Co., Ltd., Siwan. (Managing Agents—Messrs. Andrew Yule & Co., 8, Clive Row, P. O. Box No. 150, Calcutta.)	Do.	Siwan	Savan, B. N. W.	650
13. Indian Sugar Works. (Managing Partner—Maulvi Mohamad Abdul Razzaq, Siwan.)	Do.	Siwan	Savan, N. N. W.	500
*14. Bihar Sugar Works, Pachrukhi. (Agents—Messrs. Bakubhai Ambalal & Co., 27, Bastion Road, Fort, Bombay.)	Do.	Pachrukhi	Pachrukhi, B. N. W.	800
*15. Maharajganj Sugar Co., Ltd., Maharajganj. Bhargava Brothers & Co., Lessees, Maharajganj.	Do.	Maharajganj	Maharajganj, B. N. W.	300
*16. Bharat Sugar Mills, Ltd., Sidhwalia. (Managing Agents—Messrs. Birla Borthors, Ltd., 8, Royal Exchange Place, Calcutta.)	Do.	Sidhwalia	Sidhwalia, B. N. W.	300
*17. Marhowrah Factory. (Managing Agents—Messrs. Begg Sutherland & Co., Ltd., P. O. Box No. 21, Cawnpore.)	Do.	Marhowrah	Marhowrah, B. N. W.	925
18. Sitalpore Sugar Works, Ltd., (Managing Director—H. K. Ghosh, Esq., C/o Indian Press, Ltd., Allahabad.)	Do.	Sitalpore	Sitalpore, B. N. W.	600
19. The Belsund Sugar Co., Ltd. (Managing Agents—Messrs. James Finlay & Co., Ltd., 1, Clive Street, Calcutta.)	Mazaffarpur	Riga	Riga, B. N. W.	600
20. The Motipur Sugar Factory, Ltd., Motipur. (Proprietors—Seth Haji Abdulla Haroon, Napier Road, Karachi and Seth Abdul Rahim Oosman, 2, Rajmohan Street, Calcutta.)	Do.	Motipur	Motipur, B. N. W.	900
21. Japaha Sugar Factory, Japaha. (Proprietors—Messrs. Geo. Richardson, E. H. Hudson and others.)	Do.	Japaha	Muzaffarpur, B. N. W. Rly.	400

\* These factories have also refining plants.

# SUPPLEMENT TO THE "INDIAN TRADE JOURNAL".

39

LIST "A"—*contd.*  
List of Modern Sugar Factories and Refineries existing in India in the year 1934-35—*contd.*

Serial No. and Name and Address of Firm.

## I.—Factories working with Cane—*contd.*

### Bihar and Orissa—*concl'd.*

Serial No. and Name and Address of Firm.	District.	Location.	Nearest Railway Station.	Capacity.
				Tons.
*22. Samastipur Central Sugar Factory, Samastipur. (Managing Agents—Messrs. Begg Sutherland & Co., Ltd., Cawnpore.)	Darbhanga	Samastipur	Samastipur, B. N. W. Rly.	700
*23. Ryam Sugar Factory, Ryam. (Managing Agents—Messrs. Begg Sutherland & Co., Ltd., Cawnpore.)	Do.	Ryam	Tarsarai, B. N. W.	750
24. Lohat Sugar Works of the Darbhanga Sugar Co., Ltd. (Managing Agents—Messrs. Octavius Steel & Co., P. O. Box No. 55, Calcutta.)	Do.	Lohat	Sakri, B. N. W.	800
*25. Sakri Sugar Works. (Managing Agents—Messrs. Octavius Steel & Co., P. O. Box No. 55, Calcutta.)	Do.	Sakri	Do.	750
*26. Dalsinghsarai Sugar Works, Ltd., Samastipur. (Managing Agents—Messrs. Behar Trading Corporation, Samastipur.)	Do.	Ujiarpur	Ujiarpur, B. N. W.	300
27. New India Sugar Mills, Ltd., Hasanpur Road, P. O. Sakarpura. (Managing Agents—Messrs. B. R. Loyalka & Co., 7, Lyons Range, Calcutta.)	Do.	Sasan	Hasanpur Road, B. N. W. Rly.	300 may be extended to 800 tons.
28. Shri Lakshmi Narayan Sugar Works, Nirmali. (Proprietor—Gupta Bros. & Co., P. O. Nirmali.)	Bhagalpur	Manoharpati	Nirmali, B. N. W.	75
29. Semapur Sugar Factory, Semapur. (Managing Agents—Messrs. Octavius Steel & Co., Ltd., 14, Old Court House Street, Calcutta.)	Purnea	Semapur	Semapur, B. N. W. R.	500
30. The Ganga Deshi Sugar Factory, Ltd., Buxar. (Proprietors—Messrs. The Ganga Deshi Sugar Factory, Ltd.)	Shahabad	Buxar	Buxar, E. I. R.	100
31. Dumraon Raj Sugar Factory. (Proprietors—Maharaja Bahadur Sir Kesho Prasad Singh, Kt., C.B.E., Dumraon Raj, P. O. Dumraon.)	Do.	Bikramganj	Bikramganj, A. S. L. R.	250
32. Rohtas Sugar Mills. (Managing Agents—Messrs. Dalmin Sabharwal Jain & Co.)	Do.	Dehri-on-Sone	Dehri-on-Sone	1,500
33. The South Behar Sugar Mills. (Managing Agents—Messrs. Nirmal Kumar Jain & Co., Devasram, Arrah.)	Patna	Bihta	Bihta, E. I. R.	850
*34. Gaya Sugar Mills, Ltd., P. O. Guraru Purani Godown, Gaya. (Managing Director—G. S. Lal, Esq.)	Gaya	Guraru	Guraru, E. I. R.	400
<b>Bengal.</b>				
*1. Sitabganj Sugar Mills, Ltd., P. O. Sitabganj. (Managing Agents—Messrs. Surajmal Nagarmal, 61, Harrison Road, Calcutta.)	Dinajpur	Sitabganj	Sitabganj, E. B. R.	400
*2. North Bengal Sugar Mills Co., Ltd., P. O. Gopalpur. (Managing Agents—Messrs. Surajmal Nagarmal, 61, Harrison Road, Calcutta.)	Rajshahi	Gopalpur	Gopalpur, E. B. R.	650
*3. Shree Radha Krishna Sugar Mills, Ltd., Beldanga. (Managing Agents—Messrs. Jhajharin Bros., 138, Harrison Road, Calcutta.)	Murshidabad	Beldanga	Beldanga, E. B. R.	400

\* These factories have also refining plants.

## LIST "A"—contd.

## List of Modern Sugar Factories and Refineries existing in India in the year 1934-35—contd.

Serial No. and Name and Address of Firm.	District.	Location.	Nearest Railway Station.	Capacity. Tons.
<b>I.—Factories working with Cane—</b> contd.				
<b>Bengal—contd.</b>				
4. Serampore Sugar Works, Ltd., Serampore .	Hooghly . . .	Ballavpore .	Serampore, E. I. R.	100
5. The East Bengal Sugar Mills, Ltd. (Managing Agents—Messrs. Ramnath Dass & Co., Ltd., Registered Office, No. 30/31/32, North Brook Hill Road, Dacca.)	Dacca . . .	Shome (Kaliganj)	Arikhola, A. B. R.	
6. The Deshbandhu Sugar Mills, Ltd., Charsindur. (Managing Agents—Messrs. Industrial Agency, 58, Patuatuly, Dacca.)	Do. . . .	Charsindur .	Gorshol, Flag A. B. R.	150
7. Shikarpur Sugar Mills, Raja P. D. Raikut Bahadur, M. L. C. (Proprietor—Baiku- thapur Raj, Jalpaiguri.)	Jalpaiguri . .	Shikarpur . .	Belacoba, E. B. R.	150
<b>Burma.</b>				
1. Burma Sugar Co., Ltd., P. O. Sahmaw, Upper Burma. (Managing Agents—Messrs. Finlay Fleming & Co., Ltd., Merchant Street, Rangoon.)	Myitkyina . .	Sahmaw . . .	Sahmaw, Burma Railways.	600
2. The Zeyawadi Sugar Factory, Ltd., (Managing Director—Chandra Dev Prakash Sinha, Esq., P. O. Zeyawadi.)	Toungoo . . .	Zeyawadi . .	Zeyawadi, B. Rlys.	600
*3. The Thaton Sugar Works, Ltd., P. O. Bilin, Lower Burma. (Managing Agents—Messrs. Robertson & Co., P. O. Box 383, 80, Strand Road, Rangoon.)	Thaton . . .	Honipale . .	Honipale, B. Rlys.	400
<b>Madras.</b>				
1. Aska Sugar Works and Distillery, Aska. (Proprietors—Messrs. Permanand Sahu, Loknath Sahu, Jeewan Sahu, Ramchandra Sahu and Gopinath Sahu.)	Ganjam . . .	Berhampore .	Berhampore, B. N. R.	100
2. Vizagapatam Sugars & Refinery, Ltd., Tummapala, via Anakapalle, District Vizagapatam.	Vizagapatam .	Tummapala .	Anakapalle, M. S. M.	50
3. The Etikoppaka Sugar Factory. (Proprietor —M. R. Rao Bahadur C. V. S. Narasimha Raju Garu, B.A., B.L., President of the Etikoppaka Co-operative Industrial and Credit Society, Ltd., Etikoppaka.)	Do. . . .	Etikoppaka .	Narasipatam Rd., M. S. M.	50
4. Sreerama Sugar Mills, Ltd., Bobbili . . .	Do. . . .	Bobbili . . .	Bobbili, B. N. R.	150
5. The Vuyyur Co-operative Industrial and Credit Society Sugar Factory, Vuyyur.	Kistna . . .	Vuyyur . . .	Bezwada M. S. M.	850
6. Sri Ram Krishna Sugar Mills. (Managing Agents—Rao Bahadur C. V. S. Narasimha Raju Garu, Etikoppaka, Vizagapatam.)	East Godavari .	Krilampudi .	Samalkota . .	100
*7. The Indian Sugars and Refineries, Ltd. (Actg. Managing Agents—The Bombay Co., Ltd., P. O. Box No. 109, Madras.)	Bellary . . .	Hospet . . .	Hospet, M. S. M.	400
*8. The East India Distilleries & Sugar Factories, Ltd., Nellikuppam. (Managing Agents— Messrs. Parry & Co., P. O. Box 12, Madras.)	South Arcot . .	Nellikuppam .	Nellikuppam .	850
*9. Coimbatore Lakshmi Sugar Mills, Ltd., Podanur, Coimbatore District. (Managing Agents—Messrs. G. K. V. R. & Co., Podanur.)	Coimbatore . .	Podanur . . .	Podanur, S. I. R.	50

\* These factories have also refining plants.

## LIST "A"—contd.

List of Modern Sugar Factories and Refineries existing in India in the year 1934-35—contd.

Serial No. and Name and Address of Firm.	District.	Location.	Nearest Railway Station.	Capacity. Tons.
<b>I.—Factories working with Cane— concl.</b>				
<b>Bombay.</b>				
1. The Belapur Co., Ltd., P. O. Harigaon. (Managing Agents—Messrs. W. H. Brady & Co., Ltd., Royal Insurance Buildings, Church Gate Street, Fort, Bombay.)	Ahmednagar	Harigaon	Belapur, G. I. P.	600
2. The Saswad Mali Sugar Factory, Ltd. (H. B. Girme Esq., Chairman, Board of Direc- tors, Kopergaon.)	Sholapur	Akluj	Pandharpur, B. L. R.	200
3. Marsland Price & Co., Ltd., Bombay. (Managing Agents—Messrs. P. S. Construction Co., Ltd., Ballard Estate, Fort, Bombay.)	Poona	Kalamb	Barumati, D. B. R.	450
4. The Maharashtra Sugar Mills, Ltd., P. O. Belapur Road. (Managing Agents— Messrs. M. L. Dahanukar & Co., Ltd., Shrikrishna Nivas, Kalbadevi Road, Bombay No. 2.)	Ahmednagar	Belapur Road	Belapur, G. I. P.	500—600
5. The Ravalgaon Sugar Farm, Ltd., P. O. Ravalgaon, via Malegaon Camp. (Manag- ing Agents—Messrs. Walchand & Co., Ltd., Phoenix Building, Ballard Estate, Fort, Bombay.)	Nasik	Ravalgaon	Manmad, G. I. P.	300
6. The Belvandi Sugar Farm, Ltd. (Manag- ing Agents—Messrs. M. L. Dhanukar & Co., Ltd., Shri Krishna Nivas, Kalbadevi Road, Bombay.)	Ahmednagar	Belvandi	Belvandi, G. I. P.	..
<b>Indian States.</b>				
1. The Jagatjit Sugar Mills Co., Ltd., Phagwara. (Managing Agents—Messrs. Narang Bros. & Co., Ltd., 3, Montgomery Road, Lahore.)	Jullundur	Phagwara	Phagwara <sup>N</sup> . W. R.	400
2. Raza Sugar Factory, Roshan Bagh, Rampur State. (Managing Agents—Messrs. Govan Bros., Ltd., Roshan Bagh, Rampur.)	Rampur	Roshan Bagh	Rampur, E. I. R.	800
3. Kolhapur Sugar Mills, Ltd. (Managing Agents—Messrs. Shirgaonkar Bros., Kolha- pur, Shahapuri.)	Kolhapur	Kolhapur	Kolhapur, M. S. M.	300
4. The Phalton Sugar Works, Ltd., Phalton. (Managing Director—Vaman Shridhar Apte, Esq., 316, Girgaon Back Road, Bombay 4.)	Satara	Pimpalwadi	Lonand, M. S. M.	450—500
5. Shree Bhagwat Singhjee Sugar Works, Ltd., Gondal. (Managing Director—M. N. Chinoy, Esq., Gondal.)	Rajkot	Gondal	Gondal, Gondal Rly.	60
6. The Mysore Sugar Co., Ltd., Bangalore	Mysore	Mundya	Mandya, Mysore Rly.	1,400
7. The Pioneer Sind Sugar Mills Co., Ltd. (Managing Agents—Messrs. Mohatta Mukhi & Co., Ltd., P. O. Box No. 26, Mohatta Buildings, McLeod Road, Karachi.)	Navabshah	Pritamabad	Khado, Jodhpur Bikaner Rly.	300—350
8. The Jaora Sugar Mills, Jaora. (Proprietors —Kuluram Govindram, Jaora.)	..	Jaora	Jaora, B., B. C. I. Rly.	250

## LIST "A"—concl'd.

## List of Modern Sugar Factories and Refineries existing in India in the year 1934-35—concl'd.

Serial No. and Name and Address of Firm.	District.	Location.	Nearest Railway Station.	Capacity.
<b>II.—Factories working with Raw Sugar alone.</b>				
<b>Punjab.</b>				
1. Amritsar Sugar Mills Co., Ltd., Amritsar. (Managing Director—Sardar Amar Singh, Amritsar.)	Amritsar . .	Amritsar . .	Amritsar N. W. Rly.	1,100 mds.
2. The Lakshmi Sugar & Oil Mills, Ltd., Amritsar. (Managing Director—Babu Bangi Dhar Sahib, Chatiwind Gate, Amritsar.)	Do. . .	Chatiwind Gate .	Do. . .	400 „
3. Shree Guru Arjan Dev Sugar Mills, (Managing Agent—Seth Sunder Singh, Butari.)	Do. . .	Butari . .	Butari, N. W. Rly.	500 „
<b>United Provinces.</b>				
1. Srikrishna Das Sugar Mills & Distillery. (Owners—Messrs. Shri Krishna Dass Jagan Nath Prasad, Unao.)	Unao . .	Unao . .	Unao, B. N. W. & E. I. Rly.	..
2. Cawnpore Sugar Works, Ltd. (Managing Agents—Messrs. Begg Sutherland & Co., Ltd., P. O. Box 21, Cawnpore.)	Cawnpore . .	Couperganj .	Cawnpore Central, E. I. Rly.	..
3. Baijnath Balmakund Sugar Mills, Anwarganj. (Proprietors—Mr. Banke Behari Lal and Mr. Madan Behari Lal, Anwarganj, Cawnpore.)	Do. . .	Anwarganj .	Anwarganj, B. N. W. and B., B. & C. I.	..
4. Kamlapat Motilal Sugar Mills, P. O. Nawabganj. (Proprietors—Messrs. Kamlapat Motilal, Cawnpore.)	Do. . .	Rawatpur . .	Rawatpur, B., B. & C. I.	..
*5. Ganga Sugar Works, Balawali. (Managing Agents—Patel Vishnu Dutt, Ganga Glass Works, Ltd., Balawali.)	Bijnor . .	Balawali . .	Balawali . .	500 mds.
<b>Madras.</b>				
1. The Deccan Sugar and Abkari Co., Ltd., Samalkot. (Managing Agents—Messrs. Parry & Co., P. O. Box 12, Madras.)	East Godavari .	Samalkot . .	Samalkot, M. S. M.	..
2. Al. Vr. St. Sugar Mills & Distillery, Teehanalur.	Tinnevelly . .	Teehanalur .	Tinnevelly, S. I. Rly.	..
3. Lakshmi Sugar Mills . . . . .	Do. . .	Alvartirunagri .	Alvartirunagri .	3½-4 tons
<b>Indian States.</b>				
1. The Travancore Sugar Limited, Thuckalay. (Managing Agents—Vinayak Kumar & Co., Thuckalay, South Travancore.)	Trivandrum . .	Thuckalay . .	Trivandrum, S. I. Rly.	..

\* This factory has recently installed cane-crushing plant.



## Provincial Distribution of Sugar Factories existing in 1934-35.

Provinces.	Cane Factories.	Sugar Refineries.	Total.
1. Punjab . . . . .	7	3	10
2. United Provinces . . . . .	70	4	74
3. Bihar and Orissa . . . . .	34	..	34
4. Bengal . . . . .	7	..	7
5. Burma . . . . .	3	..	3
6. Madras . . . . .	9	3	12
7. Bombay . . . . .	6	..	6
8. Indian States . . . . .	8	1	9
TOTAL . . . . .	144	11	155

NOTE.—The capacities noted in these lists are approximate as additions to plant are made frequently.

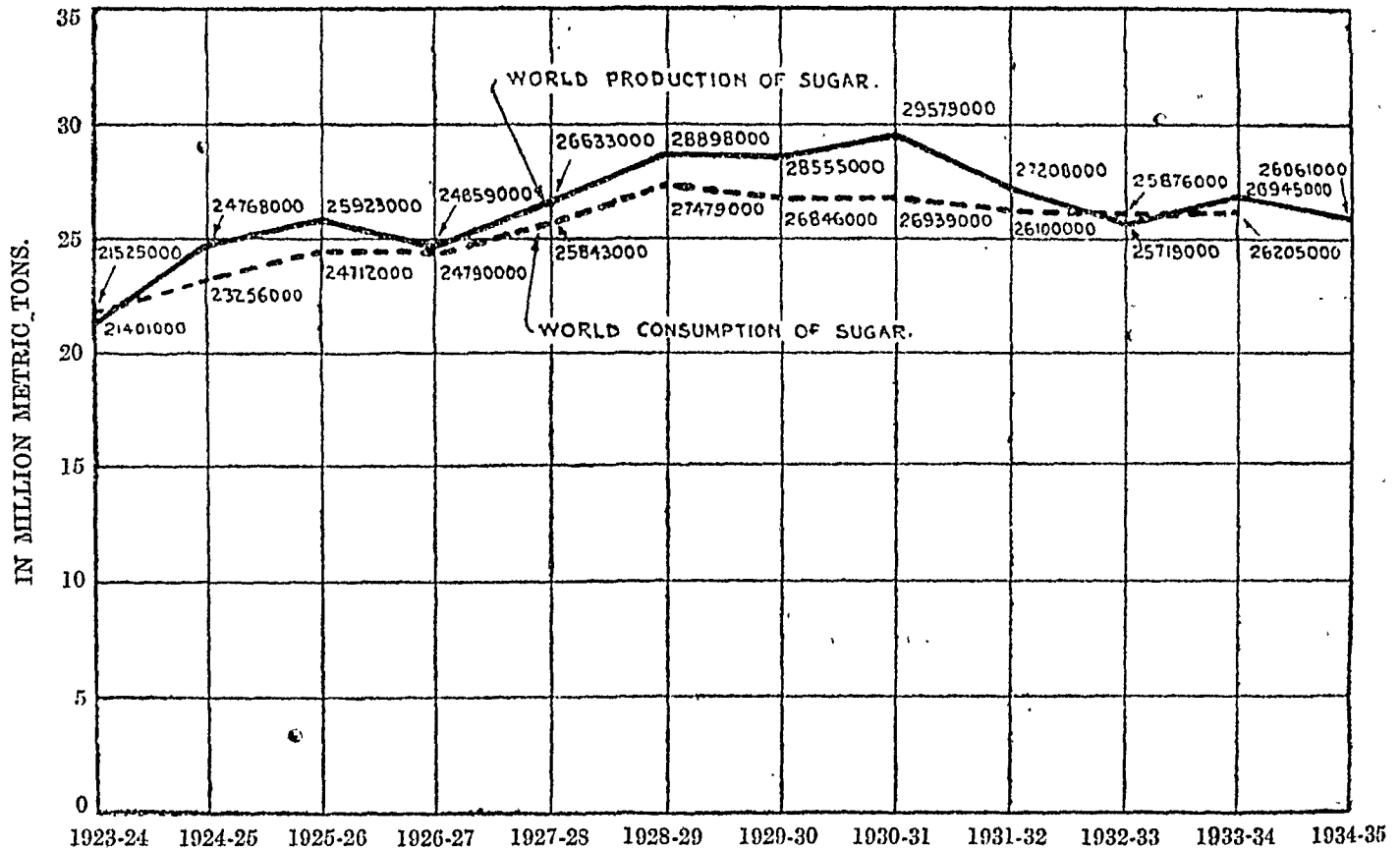
## LIST "B."

## New Sugar Factories that were Constructed for Working during 1935-36.

Serial No. and Name and Address of Firm.	District.	Location.	Nearest Railway Station.	Capacity.
<b>United Provinces.</b>				Tons.
1. The Lakshmi Sugar & Oil Mills, Ltd., Hardoi	Hardoi . . .	Hardoi . . .	Hardoi, E. I. Rly.	1,200
<b>Indian States.</b>				
1. Buland Sugar Mills, Rampur, (Rampur State). [Managing Agents—Govan Brothers (Rampur), Ltd., Rampur State.]	Rampur . . .	Rampur . . .	Rampur, E. I. Rly.	600

**REVIEW**  
**OF THE**  
**SUGAR INDUSTRY OF INDIA**  
**DURING**  
**THE OFFICIAL YEAR**  
**1933-34**

GRAPH A.—SHOWING WORLD PRODUCTION AND CONSUMPTION OF SUGAR (CANE AND BEET) FROM 1923-24 TO 1934-35.



# REVIEW OF THE SUGAR INDUSTRY OF INDIA DURING THE OFFICIAL YEAR 1933-34.

BY

R. C. SRIVASTAVA,

*Sugar Technologist, Imperial Council of Agricultural Research, India, Cawnpore.*

## I.—INTRODUCTION.

THE year 1933-34 marked another period of depression in the history of the sugar industry of the world. Though in the previous year the production of sugar fell short of consumption by 157,000 metric tons, it exceeded consumption by 740,000 metric tons during the year under review. Graph A gives a comparative view of the world production and consumption of sugar from 1923-24 to 1934-35. The Graph has been prepared on the basis of figures published by Dr. Mikusch.

The world sugar industry was also marked by several developments such as the inflationary policy of the United States of America, the attempts to make marketing agreements whereby sugar deliveries from the United States could be better adjusted to the requirements of the consuming countries, and the overthrow of the Machado Government in Cuba. The Sugar industry in Cuba had passed through a critical period and the fluctuation between the high and low prices of the year was as much as 100 points.

The condition of the sugar industry in Java was even worse during the year under review and she had to reduce price limits repeatedly in order to attract buyers. In the beginning of April, 1933, the first cost quotation of Java White Sugar was 6 guilders per 100 kilos. The price steadily declined and stood at 4-10 guilders at the end of March, 1934. The table below shows the first cost quotations for superior Java White Sugar for west coast ports of India and the Rupee/Guilder Exchange rate.

TABLE I.—First Cost Quotations for Superior Java White Sugar and Rupee/Guilder Exchange Rate (for West Coast Ports of India).

Date.	First Cost Quotation of Java Sugar.	Exchange Rate.	Equivalent in Rupees per Md.
	(Guilders per 100 kilos).	(Guilders per Rs. 100).	Rs. A. P.
4-4-33 . . .	6	63½	3 8 4
25-4-33 . . .	6	64½	3 7 3
2-5-33 . . .	6	63½	3 8 4
16-5-33 . . .	6	63½	3 8 5
6-6-33 . . .	5½	63½	3 6 3
20-6-33 . . .	5½	63½	3 6 0
11-7-33 . . .	5½	61½	3 7 6

TABLE I.—First Cost Quotations for Superior Java White Sugar and Rupee/Guilder Exchange Rate (for West Coast Ports of India)—contd.

Date.	First Cost Quotation of Java Sugar.	Exchange Rate.	Equivalent in Rupees per Mds.
	(Guilders per 100 kilos).	(Guilders per Rs. 100).	Rs. A. P.
18-7-33 . . .	5½	62½	3 7 1
1-8-33 . . .	5½	61½	3 7 6
8-8-33 . . .	5½	61½	3 8 0
4-9-33 . . .	4½	58½	2 11 7
12-9-33 . . .	5	58½	3 2 11
26-9-33 . . .	4½	57½	3 1 3
10-10-33 . . .	4½	57½	2 14 9
12-12-33 . . .	4-40	60½	2 11 6
19-12-33 . . .	4-20	60½	2 9 5
9-1-34 . . .	4-00	60½	2 7 6
6-2-34 . . .	4-10	58	2 10 1
13-2-34 . . .	4-25	56½	2 12 10
27-2-34 . . .	4-10	56½	2 11 3
6-3-34 . . .	4-10	56½	2 11 9
13-3-34 . . .	4-15	56½	2 11 9
27-3-34 . . .	4-10	56½	2 11 3

The adverse condition of the sugar industry in other important producing countries would have caused serious dislocation in the Indian market but for the reason that this market has, for some time past, been less responsive to influences abroad. The demand for imported sugar in Indian markets has undergone a remarkable change since the grant of protection to the sugar industry in India, as the Indian industry has developed its production steadily. Prior to 1932-33 there were only 31 cane factories in operation but 27 new factories were added during 1932-33 and another 65 new factories were built for working in 1933-34, making a total of 123 factories in India, an increase of almost 400 per cent in two years.

The agricultural conditions of the sugarcane crop in the provinces during the year under review were generally satisfactory. The area under sugarcane was 3,419,000 acres in 1933-34 against 3,435,000 acres in 1932-33. It is noteworthy that though the area decreased to a slight extent during 1933-34 compared with the previous year, the production of cane has increased by 3,343,000 tons over the previous year due to the increasing adoption of improved varieties of sugarcane.

The severe earthquake which occurred on the 15th January, 1934, caused very extensive damage to

the sugar industry in Bihar which is referred to in more detail in later sections of this review.

## II.—AGRICULTURAL.

According to the Final General Memorandum on the Sugarcane crop for 1933-34, the area planted with sugarcane is estimated at 3,305,000 acres as against 3,321,000 acres last year. The total yield of *gur* (raw sugar) is estimated at 5,067,000 tons, which

exceeds the last year's record yield of 4,684,000 tons by 8 per cent.

The following table shows the area (in acres) and yield (in tons) of *gur* (raw sugar) in the several provinces of India for the last two years, the average of preceding five years and also the increase or decrease in the current year over the previous year and over the average of the preceding five years:—

TABLE II.—Area under Cane and Yield of Raw Sugar (Average).

Provinces and States.	AREA (IN ACRES).			INCREASE (+) OR DECREASE (—) IN THE CURRENT YEAR OVER	
	Current Year (1933-34).	Previous Year (1932-33).	Average of Preceding Five Years.	Previous Year (1932-33).	Average of Preceding Five Years.
				Per cent.	Per cent.
United Provinces (including Rampur State)	1,731,000	1,793,000	1,483,000	—3.5	+16.7
Punjab	467,000	558,000	421,000	—16.3	+10.9
Bihar and Orissa	418,000	302,000	284,000	+38.4	+47.2
Bengal	257,000	233,000	207,000	+10.3	+24.2
Madras	120,000	125,000	105,000	—4.0	+14.3
Bombay (including Indian States)	102,000	105,000	95,000	—2.9	+7.4
North-West Frontier Province	49,000	53,000	47,000	—7.5	+4.3
Assam	34,000	32,000	35,000	+6.2	—2.9
Central Provinces and Berar	29,000	28,000	22,000	+3.6	+31.8
Delhi	3,000	4,000	4,000	—25.0	—25.0
Mysore	43,000	42,000	38,000	+2.4	+13.2
Hyderabad	46,000	40,000	(a)	+15.0	..
Baroda	2,000	2,000	2,000	..	..
Bhopal (Central India)	4,000	4,000	(a)	..	..
TOTAL	3,305,000	3,321,000	2,743,000	—0.5	(c)+18.7

Provinces and States.	YIELD (IN TONS) OF RAW SUGAR ( <i>Gur</i> ).			INCREASE (+) OR DECREASE (—) IN THE CURRENT YEAR OVER	
	Current Year (1933-34).	Previous Year (1932-33).	Average of Preceding Five Years.	Previous Year (1932-33).	Average of Preceding Five Years.
				Per cent.	Per cent.
United Provinces (including Rampur State).	2,786,000	2,612,000	1,582,000	+6.7	+76.1
Punjab	347,000	444,000	308,000	—21.8	+12.7
Bihar and Orissa	623,000	313,000	308,000	+99.0	+102.3
Bengal	457,000	454,000	239,000	+0.7	+91.2
Madras	325,000	346,000	290,000	—6.1	+12.1
Bombay (including Indian States)	266,000	275,000	254,000	—3.3	+4.7
North-West Frontier Province	56,000	45,000	60,000	+24.4	—6.7
Assam	38,000	35,000	34,000	+8.6	+11.8
Central Provinces and Berar	49,000	39,000	36,000	+25.6	+30.1
Delhi	1,000	3,000	4,000	—66.7	—75.0
Mysore	39,000	39,000	35,000	..	+11.4
Hyderabad	72,000	76,000	(a)	—5.3	..
Baroda	3,000	3,000	3,000	..	..
Bhopal (Central India)	5,000	(a)	(a)	..	..
TOTAL	5,067,000	(b)4,684,000	(c)3,153,000	(b)+8.1	(c)+58.3

(a) Not available. (b) Excluding Bhopal. (c) Excluding Hyderabad and Bhopal.

In addition to the area for which particulars are given above, the crop is grown on a small scale in certain other tracts\* in India, the average area of which for the last five years has been 114,000 acres with an estimated production of 175,000 tons.

The comparative importance of the various provinces from the point of view of cane cultivation is shown by the following table which gives the area under cane and yield of *gur* (average for the five years ending 1932-33) of each Province or State, as a percentage of the total area and yield for India :—

TABLE III.—Area under Cane and Yield of Raw Sugar (Average).

Provinces or States.	Average Percentage Area during the 5 years ending 1932-33.	Average percentage of <i>Gur</i> (Raw Sugar) Production during the 5 years ending 1932-33.
United Provinces (including Rampur State).	51.9	47.5
Punjab . . . . .	14.7	9.2
Bihar and Orissa . . . . .	9.9	9.2
Bengal . . . . .	7.6	7.2
Madras . . . . .	3.7	8.7
Bombay (including Indian States).	3.3	7.6
North-West Frontier Province.	1.6	1.8
Assam . . . . .	1.2	1.0
Central Provinces and Berar.	0.8	1.1
Delhi . . . . .	0.1	0.1
Mysore . . . . .	1.3	1.0
Hyderabad . . . . .	(a)	(a)
Baroda . . . . .	0.07	0.09
Bhopal (Central India) . . . . .	(a)	(a)

A brief survey of the agricultural conditions of the sugarcane crop in the provinces during 1933-34 is given below.

Owing to showers during the hot weather period in the United Provinces there was no excessive dryness and early indications were good. But the monsoon rains were badly distributed. The crop is reported to have suffered in its earlier stage from excessive rains, particularly in the Meerut area; but the deficient rain at the later stage improved prospects to some extent. The quality of the produce is reported to have been good on the whole.

In the Punjab a decrease of 16 per cent in area as compared with last year is attributed to the fall in price of *gur*. The total outturn was estimated to be 22 per cent less than that of the last year. Rainfall from July to September, 1933, proved beneficial to the crop except in low-lying parts of a few districts, where it was damaged by floods and excessive rains. Top-borer damaged the crop in parts of three districts. The increase in area in Bihar and Orissa was attributed partly to favourable weather conditions and partly to the opening of several sugar factories in north and south Bihar. Harvesting in Bengal was carried out under favourable conditions and a satisfactory outturn was expected for the province. The total quantity of *gur* (raw sugar) obtained from date palm juice was estimated at 100,000 tons, as against 103,000 tons in the previous year. The yield in Madras was expected to be generally normal in all districts except in Chingleput, South Arcot, the Central districts and the South, where it was expected to be below normal. The crop was reported to have been affected by a cyclone during December in Chingleput, South Arcot and Tanjore. In Gujarat in the Bombay Presidency, the crop was reported to have done well on the whole, although it suffered in places owing to untimely rains. In the north Deccan, the crop has been greatly damaged due to cold in January and this may reduce the yield to a great extent. In the south Deccan, owing to excessive late rains, the yield was estimated to be somewhat below normal although the ratoon crop was expected to return a normal yield. In the Karnatak, the crop did fairly well in the Belgaum district, but that in Bijapur and Dharwar was reported to have suffered to a great extent owing to deficient rains. In the Konkan, the crop did fairly well in the Kanara district although it suffered in places from continuous heavy rains. In Sind, the crop in the Nawabshah district suffered from frost in the first half of January, 1934, while that in the Larkana district was affected by an attack of stem-borer. The decrease in area in the North-West Frontier Province mainly occurred in the Peshawar district and was due to the lower prices of *gur*. The crop suffered from disease in parts of the Peshawar district and was damaged by intense cold in the Bannu district. Weather conditions in Assam were generally favourable for the cultivation and growth of the crop in all districts except in Cachar, Darrang and Lakhimpur, where drought and flood caused damage to the crop in some places. In the Central Provinces the season was, on the whole, favourable to the crop.

The following table gives the area under sugarcane, the yield of *gur* and the calculated production of sugarcane in India from 1924-25 to 1933-34. The assumptions on which the figures are arrived at have been stated in the Review† for 1932-33.

†Published as a Supplement to the *Indian Trade Journal*, dated the 5th July, 1934.

\*Burma, Ajmer-Merwara, Gwalior, Kashmir, Central India, Rajputana, Benares, Punjab States and Madras States.

(a) Not available.

TABLE IV.—Area under Sugarcane, Yield of Raw Sugar (Gur) and Estimated Production of Sugarcane in India.

Year.	Area under Sugarcane.	Gross Production of Gur.	Calculated Production of Sugarcane; 10 and 11 factors.
	Acres	Tons	Tons
1924-25 . . .	2,704,000	2,722,000	29,866,000
1925-26 . . .	2,806,000	3,143,000	34,382,000
1926-27 . . .	3,075,000	3,420,000	37,392,000
1927-28 . . .	3,105,000	3,376,000	36,842,000
1928-29 . . .	2,650,000	2,827,000	30,669,000
1929-30 . . .	2,677,000	2,885,000	30,961,000
1930-31 . . .	2,902,000	3,359,000	35,780,000
1931-32 . . .	3,076,000	4,116,000	43,316,000
1932-33 . . .	3,435,000	4,859,000	51,129,000
1933-34 . . .	3,419,000	5,242,000	54,472,000

It will be seen from the above table that though the area under sugarcane decreased slightly during 1933-34 as compared with the previous year, the production of cane increased due to the increasing adoption of improved varieties of sugarcane.

The cultivation of improved varieties of cane continues to increase. The following table shows the area under improved varieties of cane in various

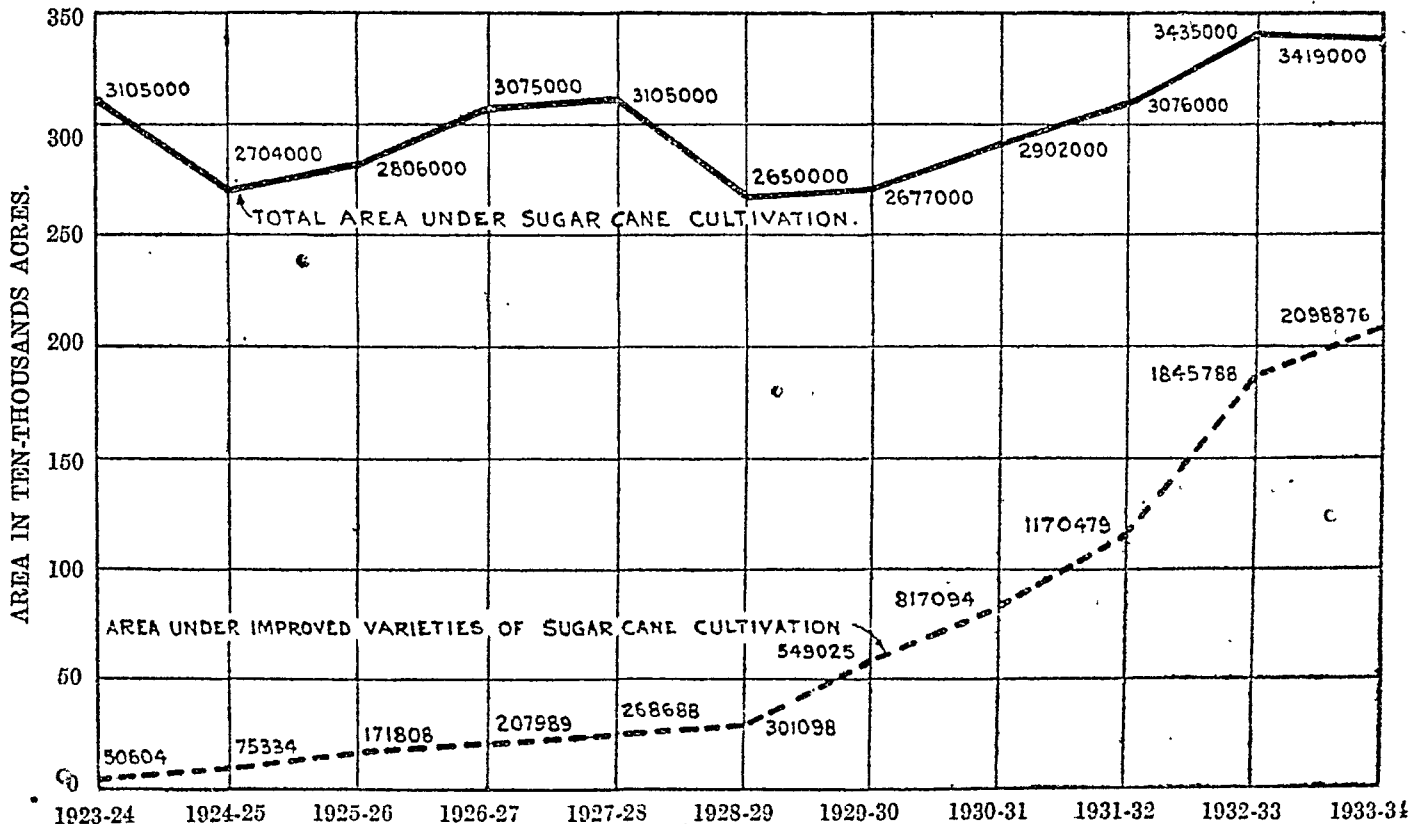
provinces of India (including Burma) during 1933-34 as compared with the preceding year:—

TABLE V.—Area under Improved Varieties of Cane in Different Provinces.

Provinces.	1933-34.	1932-33.
	Acres	Acres
United Provinces . . .	1,289,337	1,187,778
Punjab . . .	173,661	179,000
Bihar and Orissa . . .	361,300	236,000
Bengal . . .	175,415	125,000
Madras . . .	58,749	52,900
Bombay . . .	9,872	6,400
North-West Frontier Province . . .	43,000	38,000
Assam . . .	9,089	8,800
Central Provinces . . .	14,503	8,441
Burma . . .	4,190	3,669
TOTAL . . .	2,139,116	1,845,788

It will be seen that the area under improved varieties in the provinces of India amounted to about 61 per cent of the total area during the year under review as against 54 per cent of the total area during the preceding year. Graph B shows the total area under sugarcane in India and the area under improved varieties for the last eleven years from 1923-24 to 1933-34.

GRAPH B.—SHOWING THE TOTAL AREA UNDER SUGARCANE AND THE AREA UNDER IMPROVED VARIETIES IN INDIA FROM 1923-24 TO 1933-34.



A severe earthquake occurred in Bihar on the 15th January, 1934. The damage done to standing cane crop was not serious but as a result of the break down of a number of sugar factories and the dislocation of rail and road transport approximately 150 lakh maunds of cane had to be disposed of from the affected area. Out of this quantity about 30 lakh maunds was taken up by the damaged factories after they were repaired and re-started and about 33 lakh maunds was consumed by the undamaged and slightly damaged factories in the earthquake affected area. The Cane Marketing Board started by Government was able to supply further 27 lakh maunds to factories outside this area. The balance of 60 lakh maunds was either crushed in bullock-driven mills for conversion into *gur* or was used as fodder. The large quantity of cane, amounting to 90 lakh maunds, which was taken up by factories from the earthquake area had a serious effect on their average recovery of sugar as, on account of difficulty of transport, most of this cane had considerably deteriorated before it could be crushed. The damage to cane lands due to the deposition of sand is not considered to be permanent or serious.

### III.—MANUFACTURING.

The remarkable expansion of the sugar industry in India, following on the grant of protection in 1932, is shown by the rate at which new factories have been built during the last two years. Prior to 1932-33 there were only 31 cane factories in opera-

tion. The first batch of 27 new factories (including one small experimental factory) was added during 1932-33. Another 65 new sugar factories were built for working in 1933-34, making a total of 123 factories in India, an increase of almost 400 per cent in two years. Of these 123 factories, 112 are reported to have worked with cane during the season 1933-34. Of the remaining 11 factories 7 were not ready in time for working, 3 failed to submit returns and one has been excluded as it is a small experimental factory for training of students with a nominal and uncertain output.

During the season 1933-34 the production of sugar direct from cane in India totalled 453,965 tons as against 290,177 tons during 1932-33. Out of the total production for 1933-34, the production of sugar by new factories amounted to 147,706 tons, whilst that of the old factories was 306,259 tons. The production of old factories thus shows an increase of 5.5 per cent over the previous year. The total increase in the output of sugar direct from cane during the season 1933-34 over that of the previous year amounts to 163,788 tons.

The progress which the sugar industry in India is making on its technical side is shown by an analysis of the average percentage recovery of sugar from cane for factories in different provinces of India during the season 1933-34 compared with that for the preceding year. A table is given below showing the average percentage recovery of sugar directly from cane during the season 1933-34 as compared with that in the previous season :—

TABLE VI.—Average Percentage Recovery of Sugar from Cane during Season 1933-34.

Particulars.	1933-34.				1932-33.			
	United Provinces.	Bihar and Orissa.	All Other Provinces.	All India.	United Provinces.	Bihar and Orissa.	All Other Provinces.	All India.
Old Factories—								
Maximum . . . . .	10.03	10.00	10.08	10.08	9.50	9.10	11.10	11.10
Minimum . . . . .	6.87	6.27	7.10	6.27	7.00	6.10	6.90	6.10
Mean . . . . .	9.21	8.23	9.26	8.93	8.48	8.67	9.00	8.72
New Factories—								
Maximum . . . . .	10.27	9.50	9.90	10.27	9.20	9.20	..	9.20
Minimum . . . . .	6.60	5.50	4.38	4.38	6.70	6.00	..	6.70
Mean . . . . .	8.81	8.10	8.11	8.53	8.61	8.44	..	8.55
All Factories—								
Maximum . . . . .	10.27	10.00	10.08	10.08	9.50	9.20	11.10	11.10
Minimum . . . . .	6.60	5.50	4.38	4.38	6.70	6.10	6.00	6.10
Mean . . . . .	9.08	8.32	8.75	8.80	8.55	8.60	9.00	8.66

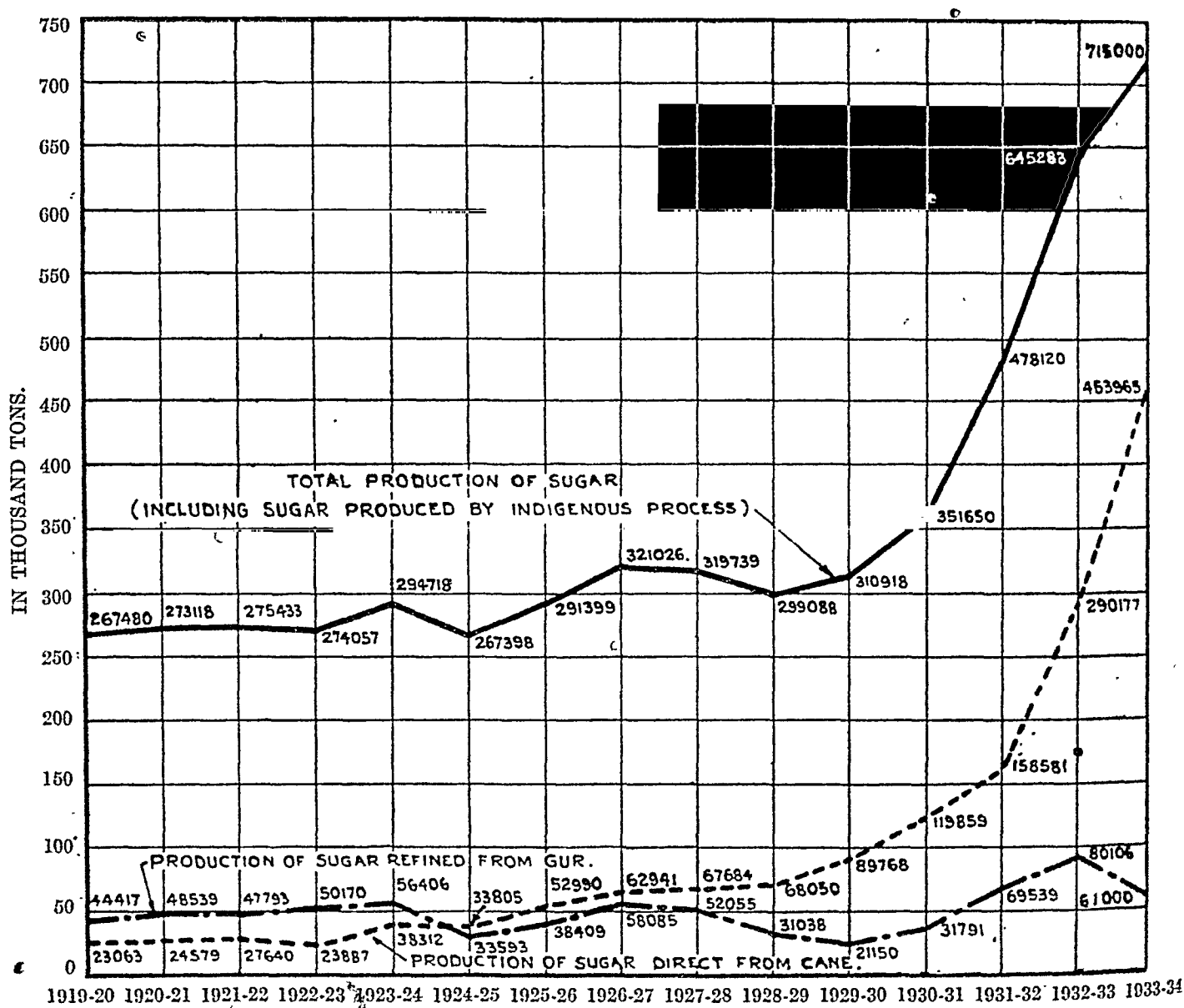


The highest recovery for the season was 10.98 per cent as against 11.10 per cent during the preceding season. It is gratifying to note that in spite of a number of adverse circumstances the average extraction for the whole of India shows a slight increase, the figure being 8.80 for 1933-34 as against 8.66 for 1932-33. The average extraction percentage shows a marked increase in the United Provinces, the figure being 9.08 per cent as against 8.55 per cent during the previous season. But in Bihar and Orissa the recovery has declined from 8.60 per cent in 1932-33 to 8.32 per cent in 1933-34, due to the havoc wrought by the earthquake which occurred on the 15th January, 1934. The earthquake caused very extensive damage to a number of sugar factories in Bihar. Of the factories operat-

ing in the Province all excepting about half a dozen had to close down temporarily after the earthquake, but fortunately the damage in most areas was not serious and the work was resumed after a short time. The cost of repairing the damage to plant and buildings of sugar factories was estimated at Rs. 20 lakhs. As a relief measure one sugar factory in the Champaran District was exempted by the Government from payment of the Sugar Excise Duty in respect of 9,000 maunds of sugar out of the quantity held in stock in that factory on the 1st April, 1934.

Graph C shows the total production of sugar including sugar produced by indigenous process and the production of sugar direct from cane as well also that of sugar refined from *gur* from 1919-20 to 1933-34.

GRAPH C.—SHOWING PRODUCTION OF SUGAR IN INDIA FROM 1919-20 TO 1933-34.



The following table shows the production of sugar direct from cane and from *gur* as well as the number of factories producing sugar direct from cane and of those refining *gur* for the last eight years.

TABLE VII.—*Production of Sugar from Cane and Gur together with the Number of Factories and Refineries.*

Year.	Production of Sugar direct from Cane.	Number of Factories that Produced Sugar direct from Cane.	Production of Sugar refined from Gur.	Number of Factories that refined Gur or Raw Sugar.
	Tons		Tons	
1926-27	62,941	25	58,085	22
1927-28	67,684	26	62,055	19
1928-29	68,050	24	31,038	14
1929-30	89,703	27	21,150	11
1930-31	119,859	29	31,791	10
1931-32	168,581	32	69,539	17
1932-33	290,177	57	80,106	27
1933-34	453,065	112	61,094	16

It will be observed from the above table that the production of sugar direct from cane as well as the number of sugar factories working with cane have been steadily increasing. The increase of the former in the year 1933-34 over the previous year amounted to about 56 per cent while that of the latter was about 96 per cent. It is estimated that production of sugar from *gur* in 1934 will be about 20,000 tons less than in the previous season.

The production of white sugar by indigenous methods is estimated at 200,000 tons in 1933-34 as against 275,000 tons in the preceding season.

As several new sugar factories were projected during the year under review, two lists of sugar factories are given in the Appendix to this review.

List A.—Modern Sugar Factories and Refineries existing in India in 1933-34.

List B.—New Factories constructed for working during 1934-35.

#### IV.—TECHNICAL AND SCIENTIFIC.

In addition to the production of new seedlings the Imperial Sugarcane Station at Coimbatore continued its work on cane breeding technique generally. Some progress was made in the matter of controlling the time of flowering of sugarcanes with the object of effecting crosses between parents which normally flower at different times. A period of over three weeks was bridged by subjecting the

canes to varying hours of day light and by planting them at different times and under different soil conditions. In the breeding of medium types for sub-tropical India, complicated crosses were effected involving at least three different species of *Saccharum*, one of them being the wild type, viz., *Saccharum Spontaneum*. The variety Co. 313 was found to be a useful parent for introducing both good habit and satisfactory juice quality. In the breeding of "Noble" types, hybrids were made between several Java canes and the best Coimbatore medium types. The resulting seedlings show that greater vigour and hardiness are likely to result from such combinations. The range of parents in the inter-generic hybrids between sugarcane and Sorghum was widened to include useful Coimbatore canes on the maternal side and various types of Sorghum on the parental side. The wild *saccharums* at the station were studied for their morphological and histological characters with interesting results.

Other studies during the year 1932-33 included (i) measurements of pollen grains with a view to establish possible relationship between size and haploid number and (ii) chromosome numbers in wild *saccharums*, bud sports and inter-specific hybrids in *saccharum*. An interesting case of polyembryony was recorded for the first time in a cross between Vellai and C. A. C. 87. In another cross (Co. 400×Co. 205) a young seedling was noticed which possessed unmistakably two plumules and two radicals. Medium Coimbatore canes, which have won considerable reputation in sub-tropical India, are proving of use in tropical India as well. Three such instances are: Co. 290 on the estate of the Belapur Company in Bombay, Co. 281 on lands attached to the sugar factory at Nellikuppam in South India and Co. 213 which has shown remarkable powers of growing under indifferent conditions in the vicinity of the Sugarcane Research Station, at Anakapalle. Certain of the seedlings which were germinated at the Karnal Sub-station showed sufficient promise for preliminary trials outside Karnal. These have been termed Co. K. series to indicate that they have been bred at Coimbatore (Co.) and selected at Karnal (K).

The Coimbatore canes have received increasing recognition in foreign countries. In Queensland both Co. 281 and Co. 290 are reported to be highly resistant to the gumming disease. In Natal Co. 290 is proving a vigorous grower nearly everywhere and has shown a high degree of immunity to both mosaic and streak diseases.

Under a scheme financed by the Imperial Council of Agricultural Research, for trying new canes at Shahjahanpur from the seedling stage, one more batch of five thousand seedlings was successfully transported to that place during 1932-33; a similar batch was also sent to the Sub-station at Karnal.

The recent expansion of the sugar industry has brought work on cane at the Imperial Institute of Agricultural Research, Pusa, into greater prominence. The enormous increase in cane cultivation caused by the almost universal drop in prices of all other crops has brought to the front several other problems which hitherto were not regarded as pressing. The great extension of the crushing season of factories has made it clear that the industry needs not only an early cane but also a late one. This need was foreseen at Pusa and experiments with a cane of this type are being conducted since the last three years. Work on Co. 281 as a cane suitable for irrigated areas under factory control has now reached the estate scale. It is hoped that large scale tests will show that an increased amount of sugar per acre over the standard variety now irrigated can be obtained in a normal crop. During 1932-33 selected varieties of cane were planted on a field scale while other varieties were under multiplication or observation in the nursery. The following canes have completed their tests and are being examined for minor points as to their suitability for various areas—Co. 299—Co. 313, Co. 331 and Co. 285. Co. 299 is practically as early as Co. 214 and far superior to it in tonnage. Co. 313 is another promising early variety but has yet to obtain a clear certificate from mosaic before any further advance can be made towards distribution. Co. 331 represents the late cane required for April and May crushing as it is of high tonnage and can stand much longer in the field without deterioration than any other variety now grown on an extensive scale in this tract. Co. 285 represents the most suitable cane for water-logged areas but the distribution of this cane has now been suspended as ample supplies of Co. 210 and Co. 213 are available to the mills and the extension of cane growing to poor land is no longer required. Another problem of great importance to cane growers is the question of the preservation of setts of *early* canes of the Co. 214 type in the field as great damage is done by jackals to the seed cane crop reserved for planting and much damaged seed has to be planted. The trashing of such early canes has been successfully accomplished and further work is now in progress. The varieties Co. 303 and 322 are liable to lodge badly but they have been retained for the present to see whether inter-locking with Co. 213 will prevent lodging. Of other seedlings Co. 337, 338, 343 and 304 are still under observation whilst Co. 300, 301 and 302 were discarded as they failed to compete successfully with early and mid-season standard varieties; Co. 312 which is one of the heaviest yielders lodged very badly and was quite unable to stand after September and had therefore to be discarded; Co. 316 was discarded for tonnage while 317, 318 and 319, which were of the Co. 285 type were found inferior to this cane and were rejected; Co. 326 lodged very badly and was of poor sucrose content

and tonnage. Co. 335 showed very poor growth and was of exceedingly low tonnage. Co. 340, 341, 342, 345, 346 and 349 were rejected on account of unsuitable agricultural habit. Co. 351 to Co. 357 which are some of the first Sorghum hybrids to be extensively used, were expected to ripen in 6 months' time from the date of planting, but did not come up to expectation. P. O. J. 2878 has been finally discarded for this tract on account of stunted growth and unsuitable agricultural habit. Manurial experiments were also conducted on Co. 210 with superphosphate and oil cake, diamphosphos and the standard manure, oil cake alone, sulphate of ammonia and nitrate of soda. Manurial experiments on Co. 213 were also conducted with mustard cake, sulphate of potash and superphosphate.

In the United Provinces the area under improved varieties of sugarcane during 1932-33 was 73 per cent of the total area. Rapid progress has been made in Meerut, Rohilkhand, Agra, Lucknow, Gorakhpur and Fyzabad divisions where these improved varieties occupied 89 per cent, 78 per cent, 67 per cent, 74 per cent, 79 per cent and 64 per cent, respectively, of the total area under cane. Both the total area under sugarcane and area under improved varieties show a substantial increase over the preceding year but the increase was partly accounted for by an increased area under ratooned cane. In addition to the standard canes Co. 212, 290, 244, certain other canes are coming into general cultivation, of which possibly the best are Co. 312 and Co. 300; indeed the former is regarded by many having regard to tonnage and other characters as probably the best all-round cane introduced since Co. 213. It has, however, a tendency to lodge under intensive cultivation and flowers readily. Co. 300 is a fine cane with high sucrose content and good purity but is extremely soft and liable on this account to a good deal of damage. Another cane Co. 313 is of considerable promise as one of the highest yielders, under good farming conditions, as yet produced, but it has been withheld from introduction as stocks at most farms are found to show mosaic. Co. 244 is still the poor man's cane for the Western Circle in the provinces. The Sorghum hybrid varieties are still under examination. One or two show some indication of being effective canes; but it is not certain that any of them will come up to original expectations.

In Bihar and Orissa the spread of Coimbatore varieties of sugarcane has been increasing during the past five years. In Bihar proper about 86 per cent of the cane acreage is under improved varieties, and they are spreading so rapidly that very soon local varieties are likely to be completely ousted. In north Bihar the development of white sugar industry has given a great impetus to the extension of cane area. Varietal trials on this crop continued on all farms. Sepaya had some 46 Coimbatore seedlings under trial, south Bihar 17 and Orissa

about 12. For both north and south Bihar conditions a preliminary selection of early, mid-season and late canes has been made and field trials have been started. In Orissa the success of the method of "mud-planting" hardy canes, such as Co. 205 and Co. 285 has been confirmed. Elaborate manurial trials, to find the optimum dose of nitrogen for heavy rich lands of south Bihar, have been started at the Patna farm. In north Bihar 40 lbs. nitrogen combined with 50 lbs.  $P_2O_5$  gives indication of being the most economical dose. Very heavy crops of both plant and ratoon canes were raised on the Kanke farm in Chota Nagpur with 80 lbs. nitrogen per acre. Work on this crop has been greatly developed as the outcome of a grant from the Imperial Council of Agricultural Research. The new Sugarcane Research Station is situated at Mushari, five miles from Muzaffarpur. The primary object of the scheme is the testing and multiplication of improved sugarcane varieties to suit the different conditions prevailing in the province and to meet the requirements of the white sugar industry in the way of early, mid-season and late canes. The following work on sugarcane was done on this Research Station during 1932-33. Some 40 Coimbatore seedlings were under trial. Complete growth histories, for twenty of the most promising ones have been worked out and from these studies it appears that cane varieties have two growth maxima—one in early July and the other towards the end of August or early September—depending upon whether a variety is early or late. Soil moisture studies show that when this falls below 5-7 per cent in the first foot, cane growth appears to cease in north Bihar soils. Soil analysis records for the province have been collected and an effort is being made to make rough divisions for future variety distribution. Studies on the physical properties of soil such as penetrability, cohesion, plasticity, etc., have been started. Physiological investigations centre round detailed studies of foliage and roots in relation to environment. Successful setting of viable seeds in a number of varieties has been obtained under controlled temperature and humidity conditions. Viable seeds have been obtained in the following cases—Cos. 300×326, Cos. 312×326, Cos. 312×346, Cos. 312×285. Selfed seeds have been obtained in the case of Cos. 205, 285, 323, 312, 326 and 346.

Work on the design of a small power-driven sugarcane crusher in Bihar and Orissa for which the Imperial Council of Agricultural Research sanctioned a grant, was started in 1931. In 1931-32 the first experimental mill was manufactured and was given extensive trials, as a result of which certain minor changes in the design were incorporated in a second experimental mill which was manufactured during the year 1932-33 and tested during the last crushing season. The mill has come out success-

fully from these tests and the design has therefore been standardized. During the trials of the first experimental mill it became obvious that the mill as designed, although excellent from the point of large growers, was perhaps too big for the smaller cultivators. It was therefore considered desirable that another mill of a somewhat similar design but of more compact type and having about half the capacity was likely to meet a demand. The design was approved by the Sugar Technologist to the Imperial Council of Agricultural Research and the construction of the first experimental small mill was taken up. The short period over which it was tested indicated a few minor defects. The manufacture of the second experimental mill is now being taken up. At the Patna farm work was started during 1931-32 on testing various methods of manufacturing Khandsari sugar. As a result of past two seasons' work a very simple single pan furnace and process of juice boiling have been evolved; the latter requires some further work; however, before it can be recommended for adoption.

In the Punjab, Coimbatore canes continued steadily to grow in popularity and it was estimated that of the total area under sugarcane in the province over 31 per cent was sown with these improved varieties. The variety Co. 285 is at present the principal cane recommended by the department, because of its high yield, but the experimental work in progress indicates that before long the department will be in a position to recommend certain other very high yielding varieties. An analytical survey of the varieties grown was continued in the main sugarcane districts, viz., Sialkot, Gujranwala, Amritsar, Gurdaspur, Hoshiarpur and Jullundur and Co. 285 was found to be the heaviest yielder under *zamindari* conditions. Co. 281 and Co. 313 were least affected by frost and Co. 312 which has been newly introduced seems to have an assured future. Co. 223, which at one time was regarded as one of the best quality canes, is now going out of favour owing to its susceptibility to disease and to attack by pest. It was also observed that artificial manures favourably affected the maturing and tonnage of the cane, but not its sucrose content. Potassium Nitrate enabled the crop to resist low temperatures better than any other artificial manures. Experiments carried out during the last three years at Lyallpur and Gurdaspur have shown that there was no deterioration either in the yield or quality of *gur* and juice from cane affected by mosaic. A special study of sugarcane borers was made. Following the trials of certain power cane crushers financed by the Imperial Council of Agricultural Research, a new cane crusher believed to be suitable for the Punjab conditions has been designed. From finances provided from the same source a trial mill has been made up and will be tested out during the coming sugarcane crushing

season. Experiments were carried out at Jullundur farm on the "Open Pan" manufacture of white sugar but more work remains to be done before definite conclusions can be formulated. Molasses are rich in potash and, as large quantities are now becoming available as a bye-product in the sugar industry, a study was made of the effect of composting molasses to find out the amount of potash rendered available under this treatment. A series of comparative experiments, involving the use of molasses and other potassic manures, was started on two different soils and the result is awaited with interest, as the disposal of molasses has now become a problem.

In the Madras Presidency a large number of varieties of sugarcane was grown on most of the agricultural experimental stations. The Agricultural Research Station, Anakapalle, showed the greatest activity in sugarcane research. A varietal study according to manurial and irrigational requirements has indicated that the two best canes were M. A. 21, a seedling cane raised at Anakapalle under liberal manurial and irrigational treatment and Co. 213 under restricted conditions. The latter, a seedling cane from Coimbatore, is being grown elsewhere too as a drought resister and has been the most popular of all. At Samalkota, 34 new seedling cane varieties have been studied where also Co. 213 is most promising. At Palur, Anakapalle, Samalkota and on two other stations, Sorghum hybrids were under preliminary trials. While at Anakapalle these seem to take as long as 9 months to mature, at Palur, the same varieties seem to be ready in  $7\frac{1}{2}$  months. These crosses have a great future as it would be possible in the same year to raise another crop following sugarcane. In other farms these seem to mature in between seven and eight months. Experiments are also in progress to find out whether varieties other than Sorghum hybrids have more than one ripening season as is known to be the case in a few areas and what are the most suitable months for growing various varieties in different tracts. In an irrigation experiment at Anakapalle it has been found that by irrigating only at the time of planting, Co. 213 under February and April planting gave 37 and 52 per cent increase in yield over J. 247, respectively, while in M. A. 21 the increase was 15.5 and 33 per cent, respectively. Other experiments at Anakapalle were in regard to spacing, methods of planting and wrapping, etc. At Samalkota, apart from a variety of experiments in progress, new experiments consisted of (i) shallow trench planting *versus* bed planting, (ii) treating setts with lime water, tepid water and prolonged soaking in cold water, (iii) planting setts eye to eye and obliquely compared with normal end-to-end planting with a view to test their effect on germination, and (iv) spacing in rows. Manurial experiments were in progress at Samalkota, Anakapalle and Palur. At Palur experi-

ments were in progress for the last five years which indicated that Fiji B, the local standard variety, responds most to heavy manuring of 200 lbs. nitrogen per acre in the shape of oil cake and ammonium sulphate in the proportion of 3 : 2. It was also found that the application of the manure in three doses is preferable to applying it in single or double doses. The efficacy of ammonium sulphate for cane as compared with groundnut cake where either was tried in conjunction with farm yard and other organic manure was demonstrated at Anakapalle. Ammonium sulphate gave an average net profit of Rs. 63 per acre as against Rs. 22 for groundnut cake during the last four years. A rotation experiment has been in progress for the last nine years. The results have shown that it is detrimental to the soil to grow cane in alternate years and that it is more economical to grow it once in three years, while good yields are obtained by growing it once in four years. Sugar manufacture under 'ryots' condition was demonstrated at Anakapalle and Palur with success. *Rab* was prepared on the Rohilkhand bel, Sindwahe and Godavari furnaces and centrifuged. The experiment to study the relative resistance of different varieties to sugar cane mosaic was continued. Twenty varieties of canes were grown inter-stripped with rows of diseased Co. 213 material. Of these eight varieties proved highly resistant while four proved highly susceptible. The experiment to determine the loss due to the attack of mosaic was repeated and the results obtained are in conformity with those obtained last year. The reduction in sucrose was not so marked but the reduction in weight of canes was considerably higher.

In Bengal sugarcane has established its value as a money crop in partial substitution for jute. It is estimated that improved varieties of sugarcane are now grown on an area of  $1\frac{1}{4}$  lakhs of acres. Co. 312, Co. 270 and Co. 285 were best in general habit and growth. P. O. J. 2878 continued to harden and was not much affected by borer. Trials of Co. 213 on *mid-aman* paddy lands were generally successful. The demand for cuttings of Co. 213 sugarcane has increased. A survey of sugarcane tracts has shown that compact areas can be found in various parts of the districts of Rangpur, Bogra, Rajshahi, Dinajpur and Malda in the Rajshahi division, Faridpur, Dacca and Mymensingh in the Dacca division; Nadia, Jessore, Murshidabad and the 24 Parganas in the Presidency division; and Burdwan in the Burdwan division. The cane crushing mill designed by the Agricultural Engineer was further improved with satisfactory results; its capacity was not below 30 maunds of cane per hour while 44 maunds was the maximum and the maximum extraction is reported as having risen to 74 per cent. A power-driven pugmill and an improved type of furnace have also been designed and are under test.

The area under sugarcane in Burma is small but there are indications that owing to the low price of paddy increased interest is being taken in the crop. At the Pynmana Agricultural Station a great deal of useful information has been collected regarding fertilizers and cultivation methods with this crop and several varieties of valuable exotic canes from Java and elsewhere have been under test. Of the new introductions the Java cane P. O. J. 2878 grown on a block of 5 acres gave a yield of 44.6 tons of stripped cane per acre after one year's growth and from one acre of this block 2,246 viss of jaggery was produced. The new Coimbatore seedlings, viz., Co. 402, Co. 408 and Co. 414 have been introduced for trial. In a fertilizer experiment it was proved that the addition of 15, 30, 45 and 60 pounds of nitrogen (sulphate of ammonia) per acre gave increased yields of canes of 11 per cent, 20 per cent, 32 per cent and 42 per cent, respectively, while the addition of similar quantities of phosphate in the experiment did not enhance the yield of the cane nor expedited ripening. No mosaic disease of sugarcane was discovered on the experimental farm at Pynmana but some was found on the cultivators' plots. A banded Sclerotial disease was observed for the first time in Burma on exotic sugarcane varieties but it did not cause any great damage. During 1931-32 a comparison was made between the indigenous method of digging pits in the bottom and of the method of simply laying the canes in the trenches without making pits. The results appear to indicate that the local method of digging is more profitable and that deep planting is necessary where no irrigation is available.

The work on the Jorhat farm in Assam consists mainly of the acclimatization and selection of varieties of cane under chemical control, cultural and manurial experiments. Of the canes received from Coimbatore in 1929, Co. 243, Co. 290 (thin canes) and P. O. J. 2878 (a thick cane) have done well in the field trials and have been issued to cultivators. Co. 312 has been rejected on account of its bad field behaviour. Co. 214 received in 1930 had to be rejected as unsuitable. Of the five varieties received in 1931, Co. 361 and Co. 363 appear promising. Of the twelve Coimbatore canes received in 1932, Co. 407, Co. 408 and Co. 413 promise well. Sixteen new Coimbatore canes were received in March, 1933, for trial. The following varieties were grown as plant canes for comparison: H. 109, Co. 290, P. O. J. 2878, Co. 291, P. O. J. 2725, Co. 210, P. O. J. 2714 and Co. 243. The previous year's plant canes with the exception of Co. 223 and Co. 291 were ratooned. The results of the chemical analysis of the experimental canes both plant and ratoon are briefly as follows: In the plant canes, Co. 290 gave the heaviest yield of stripped cane and sucrose followed by P. O. J. 2714

and P. O. J. 2878. The quality of juice was the best with P. O. J. 2714 followed in order by P. O. J. 2878 and Co. 290. These three varieties were found to be distinctly superior to all others. Co. 243, a new promising variety, gave almost as heavy outturn of cane as Co. 290 but due to its poor quality of juice its outturn of sucrose was low. P. O. J. 2725 gave a fair outturn of cane and sucrose per acre. H. 109 and Co. 210 gave good crops but their outturn of sucrose was low. Co. 291 gave the poorest crop and its yield of sucrose was decidedly poor. In the ratoon canes P. O. J. 2714 gave the heaviest yield of sucrose per acre closely followed by Co. 290 and H. 109. Co. 213 and Co. 210, although giving a heavier outturn of stripped cane than P. O. J. 2714, failed to give a satisfactory outturn of sucrose due to inferior quality of its juice. D. 74 and B. 6308 which gave poor crops also gave the poorest yield of sucrose; these two varieties are very late ripeners. P. O. J. 1547 gave the poorest cane crop but nevertheless the quality of its juice was the best and consequently it gave a heavier yield of sucrose. The new variety Co. 243 appears to be a heavy yielder but its ripening quality is almost the same as that of Co. 213 and Co. 210. From every point of view, however, P. O. J. 2714 was the best cane closely followed by Co. 290 which appears to be distinctly promising. The average yield of *gur* per acre of plant and ratoon canes, over the whole farm was 4,953 lbs. per acre against 4,228 lbs. in the previous year. The average outturn per acre of the experimental crop was 28.26 and 26.76 tons of stripped cane for the plant and ratoon canes, respectively, against 20.6 tons and 26.79 tons in the previous year. The field trial of October planting was continued with P. O. J. 2714, the control plot being planted during following March. Although earlier planting had only a slight effect on the time of maturity the crop flowered about three weeks earlier and gave an increased yield of 25 per cent. The experiment will be continued. Experiment on the preservation of *gur* in paraffined earthen containers confirmed the previous experience that *gur* remains in good condition in such receptacles. Collar rot (*Melanconium Saccharin*) appeared as usual but was kept under control by continued selection of setts. The varieties of sugarcane grown at the farm were kept under observation to find out their susceptibility to this disease. This is a regular pest of sugarcane throughout the Assam valley.

The average yield per acre in the Kopargaon farm in Bombay was 10,888 lbs. of *gur* for plant cane and 8,738 lbs. of *gur* for ratoon cane as against 12,010 lbs. of *gur* for plant and 6,258 lbs. for ratoon during the last year. The variety D. 109 has been dropped this year. Amongst the present varieties P. O. J. 2878 has given the best results as a ratoon and E. K. 28 came next. Co. 290 thrives well in low-



lying situations while H. M. 89 is an early variety, non-arrowing and erect. Four factories in the Bombay Deccan have substantial areas under E. K. 28 and P. O. J. 2878. In addition, H. M. 320 and the new Sorghum cane hybrids have been tried at Belvandi and Belapur and some of these are very promising. The results of the four years' experiments on nitrogenous requirements of the local Pundia indicate that the average cane weights both in plant cane and ratoons show increase with increasing doses of nitrogen. At the Kopargaon farm trials were continued on improved method (the modified *manjri* farm system) *versus* local method of planting cane. These show that the cost of cultivation by the local method is comparatively high. A study of culminating point in the ripeness of cane has been going on for three years at Hol where tests were taken at intervals of ten to twelve days and the weights of cane, extraction, brix, weights of *gur* and *gur*-juice cane ratio were recorded for the two varieties, E. K. 28 and Pundia. The best time for harvesting of E. K. 28 was found to be 12 months and 8 days and for Pundia 13 months and 20 days. The Sugar Research Station for the Bombay Deccan situated at Padegaon on the Nira left Bank Canal, is financed by the Imperial Council of Agricultural Research. A study of the Deccan sugarcane soils, work on the physiology of sugarcane and varietal trials are now in full swing.

The total area under sugarcane in the North-West Frontier Province during 1933-34 was 49,000 acres, but this area can be increased if proper marketing facilities are provided. Experiments on varieties grown in 1931-32 at Tarnab were continued during 1932-33. Most of the area is covered by Paunda and Assam Red which have done fairly well in the past. Among the new varieties, Co. 285, Co. 360 and Co. 210 appear to be fairly promising. At the Haripur Farm Co. 213 and Co. 290 were ratooned for the second year and the *gur* yields of both varieties decreased in the year 1933 compared to their yield in 1932. This reduction in yield was due to the dry weather that prevailed in the months of September, October and November. Co. 290, which is an early maturing cane, gave better results than Co. 213.

#### V.—FISCAL.

During the year under review, the protective duty on foreign sugar remained at Rs. 7-4-0 per cwt., the rate fixed by the Sugar Industry (Protection) Act of 1932. And as the revenue surcharge of 25 per cent (amounting to Rs. 1-13-0 per cwt.), which was imposed in September, 1931, was also continued, the total import duty on foreign sugar amounted to Rs. 9-1-0 per cwt.

The import duty on molasses (including the surcharge) continued at 31½ per cent *ad valorem*. The tariff valuations of molasses for the purpose of

levying duties were fixed as shown in the following table :—

TABLE VIII.—*Tariff Valuation of Molasses.*

Molasses.	TARIFF VALUATION.	
	16th January, 1933, to 31st December, 1933.	1st January, 1934, to 31st December, 1934.
1. Imported in bulk by Tank Steamer.	Rs. 1 13 0 per cwt.	Rs. 1 2 0 per cwt.
2. Otherwise Imported	Rs. 2 5 0 per cwt.	Rs. 1 10 0 per cwt.

Two bills were introduced in the Legislative Assembly on the 27th February, 1934, one to provide for the imposition and collection of an excise duty on sugar and the other to regulate the price of sugar-cane intended for use in sugar factories. The two bills resulted respectively in Acts XIV and XV of 1934, which received the assent of the Governor-General on the 1st May, 1934.

The Sugar (Excise Duty) Act of 1934 provides that a duty of excise shall be levied on all sugar produced in any factory in British India and either issued out of such factory on or after the 1st April, 1934, or used within such factory on or after this date in the manufacture of any commodity other than sugar, the duty payable being at the following rates :—

- (i) On *Khandsari* sugar (that is, sugar in the manufacture of which neither a vacuum pan nor a vacuum evaporator is employed), at the rate of ten annas per cwt.;
- (ii) On all other sugar except *palmyra* sugar at the rate of one rupee and five annas per cwt.;
- (iii) On *palmyra* sugar (that is, sugar manufactured from *jaggery* obtained by boiling the juice of the *palmyra* palm) at such rate, if any, as may be fixed by the Governor General in Council after further enquiry.

It may be pointed out that "sugar" for the purpose of this Act means any form of sugar containing more than ninety per cent of sucrose. In order that the sugar may be taxable, it must be produced in a "factory," which means any premises wherein, or within the precincts of which, twenty or more workers are working or were working on any day of the preceding twelve months, and in any part of which any manufacturing process connected with the production of sugar is being carried on or is ordinarily carried on with the aid of power. The sugar produced by the purely agricultural section of the open pan sugar industry which consists of individual units employing less than twenty workers

or which work without the aid of power, is, therefore, not liable to excise duty. Similarly products like *gur* and *rab*, which do not contain 90 per cent or more of sucrose are not liable to the duty.

The duty under this Act is levied only on sugar produced in British India. In regard to sugar produced in an Indian State, the Act provides that the Governor General in Council may, by notification in the *Gazette of India*, impose on sugar brought into British India from the territory of any State in India (not being territory which has been declared under Section 5 of the Indian Tariff Act, 1894, to be foreign territory for the purposes of that section), a duty of customs equivalent to the excise duty imposed by this Act on sugar produced in British India.

The Sugarcane Act, 1934, is intended to secure to sugarcane growers a fair price for their produce and to regulate the price at which sugarcane which is to be used in the manufacture of sugar may be purchased by or for factories. The Act provides

that a Local Government may declare any specified area to be a "controlled area" and that it may prohibit the purchase, in such area, of sugarcane intended for use in any factory otherwise than from the grower or from a licensed purchasing agent. It also empowers the Local Government (subject to the control of the Governor General in Council) to fix, by notification in the local official gazette, a minimum price or minimum prices for the purchase in any controlled area of sugarcane intended for use in any factory.

#### VI.—ALL-INDIA TRADE IN SUGAR MACHINERY.

The value of sugar machinery imported into India during the year under review was Rs. 3,36,38,814 as against Rs. 1,53,11,126. The following table gives the value of imports of sugar machinery into India from 1924-25 to 1933-34, together with details of countries from which imported and of the share of each maritime province into which the machinery was landed on arrival in India:—

TABLE IX.—Value of Imports of Sugar Machinery together with the Share of each Maritime Province of India during the last Ten Years.

Whence Imported.	1924-25.	1925-26.	1926-27.	1927-28.	1928-29.	1929-30.	1930-31.	1931-32.	1932-33.	1933-34.
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
United Kingdom . . . . .	15,56,182	12,31,183	5,55,001	7,25,056	16,30,487	8,49,343	10,82,836	26,22,991	91,48,018	1,95,87,559
Ceylon . . . . .	..	..	..	..	..	1,086	..	..	38	..
Hongkong . . . . .	..	..	..	..	..	140	..	..	..	..
Germany . . . . .	836	2,47,563	21,489	1,11,287	23,215	8,332	23,233	1,16,670	17,83,649	23,11,442
Netherlands . . . . .	..	..	..	..	..	..	..	..	10,88,971	60,53,605
Belgium . . . . .	20,582	235	1,385	5,972	..	3,110	..	22,751	31,76,262	34,79,283
France . . . . .	69,441	54,746	7,804	45,245	61,087	30,421	2,30,323	2,22,297	26,880	39,541
Italy . . . . .	..	..	..	..	..	625	..	..	231	13,444
United States of America and Atlantic Coast.	14,750	63,388	35,068	21,838	36,852	28,022	32,324	27,382	16,324	22,021
Czechoslovakia . . . . .	..	..	..	..	..	..	..	..	68,019	11,13,491
Other Countries . . . . .	..	..	..	..	..	..	..	358	2,734	18,426
<b>TOTAL</b> . . . . .	<b>16,61,811</b>	<b>15,97,117</b>	<b>6,20,837</b>	<b>9,13,298</b>	<b>17,51,641</b>	<b>9,21,079</b>	<b>13,68,716</b>	<b>30,14,440</b>	<b>1,53,11,126</b>	<b>3,36,38,814</b>
<b>Share of—</b>										
Bengal . . . . .	11,74,354	14,92,474	5,30,842	7,14,816	16,54,110	5,44,083	12,45,079	27,68,436	1,31,53,519	2,13,91,749
Bombay . . . . .	3,55,751	70,690	54,246	43,581	73,794	33,642	90,186	72,348	11,08,916	65,93,095
Sind . . . . .	85,508	6,229	2,856	10,923	517	3,17,256	19,405	69,563	6,26,660	46,98,396
Madras . . . . .	40,067	19,286	10,826	1,27,535	22,906	14,790	12,962	1,02,945	4,18,783	8,96,818
Burma . . . . .	4,131	8,438	12,067	16,443	305	11,308	1,084	1,157	3,248	55,816
<b>TOTAL</b> . . . . .	<b>16,61,811</b>	<b>15,97,117</b>	<b>6,20,837</b>	<b>9,13,298</b>	<b>17,51,641</b>	<b>9,21,079</b>	<b>13,68,716</b>	<b>30,14,440</b>	<b>1,53,11,126</b>	<b>3,36,38,814</b>



A list of new sugar factories under construction for operating during the season 1934-35 is given in the Appendix to this Review. The following table shows the number of plants ordered from each country and the aggregate capacity in tons of cane crushed per day. These figures are exclusive of

machinery ordered for purposes of replacement or extension by existing factories.

Three factories in the list are not taken into account as two are refineries and information from one regarding its capacity has not been received.

TABLE X.

Particulars.	Indian.	British.	German.	Others.	Total.
Number of Plants ordered . . . . .	2	13	3	1	19
Aggregate Capacity (Tons Cane per day) . . .	150	4,120	500	400	5,170
Percentage of Total Number of Plants . . . .	10.5	68.4	15.8	5.3	100
Percentage of Total Capacity . . . . .	2.9	79.7	9.7	7.7	100

The capacities of plants given in the above table are based on those stipulated in the contracts. Actually most plants give working capacities 15 to 30 per cent above the contract capacities.

## VII.—ALL-INDIA SUGAR TRADE.

### (1) Gur.

(a) *Production*.—The net production of *gur* in India during 1933-34 is estimated at 3,597,000 tons as against 3,245,000 tons in the preceding season. The total increase in the output of *gur* during the season 1933-34 over that of the previous year amounts to 352,000 tons or about 10.8 per cent. The following table shows the calculated net production of *gur* in India during the last ten years:—

TABLE XI.—Calculated Net Production of Gur in India for Direct Consumption.

Year.	Calculated Net Production of Gur.
	Tons.
1924-25 . . . . .	1,698,000
1925-26 . . . . .	2,089,000
1926-27 . . . . .	2,313,000
1927-28 . . . . .	2,276,000
1928-29 . . . . .	1,778,000
1929-30 . . . . .	1,837,000
1930-31 . . . . .	2,245,000
1931-32 . . . . .	2,772,000
1932-33 . . . . .	3,245,000
1933-34 . . . . .	3,597,000

\*Figures for net production are calculated from the figures for total yield of *gur* given in the "Final General Memorandum" each year by allowing for the *gur* equivalent of cane used for other purposes (adopting the conversion factor of 10).

(b) *Imports by Land*.—There were no imports of *gur* and *jaggery* by land from countries situated on India's borders, and imports of the commodity through land frontier routes of Burma amounted to about 38 tons as against 1½ tons in the preceding year.

(c) *Exports by Sea and by Land*.—The exports by sea of cane and palm *jaggery* increased from 819 tons valued at Rs. 1,40,098 to 1,201 tons valued at Rs. 1,73,162 during the year under report, of which Ceylon took 899 tons valued at Rs. 1,19,519. The exports by land of unrefined sugar from India and Burma totalled 6,286 tons as against 3,195 tons in 1932-33.

### (2) Sugar.

(a) *Home Production*.—As already stated the production of sugar by modern factories and refineries in India was 370,283 tons in 1932-33 as compared with 228,120 tons in 1931-32. Adding to this total an estimated production of 275,000 tons of sugar manufactured by the indigenous process the total production for 1932-33 amounted to 645,283 tons as against 478,120 tons in 1931-32. In 1933-34 production of sugar direct from cane amounted to 453,965 tons and as sugar manufactured by refineries and indigenous process is estimated at 60,000 tons and 225,000 tons, respectively, during the season 1933-34, the total production may be put at 738,965 tons.

(b) *Exports of Indian Sugar by Sea.*—Exports of sugar from India by sea amounted to 425 tons valued at Rs. 64,451 as against 437 tons valued at Rs. 70,147 last year.

(c) *Imports of Foreign Sugar by Sea.*—Imports of sugar, excluding molasses, during the year under review amounted to 261,300 tons, valued at Rs. 2,70 lakhs, as against 369,500 tons, valued at Rs. 4,12 lakhs during the previous year. This decrease was due principally to the expansion of the home industry. The quantity of Java sugar imported, amounted to 194,400 tons during the year under report against 294,800 tons during the previous year. Imports of beet sugar also decreased to 27,556 tons valued at Rs. 28 lakhs as compared with 40,690 tons valued at Rs. 42 lakhs during the previous year.

Imports of Java sugar were distributed amongst the different maritime provinces as follows:—

Province.	1932-33.	1933-34.
	Tons.	Tons.
Bengal . . .	86,000 (29 p. c.)	23,000 (11.8 p. c.)
Bombay . . .	87,000 (29 p. c.)	74,700 (38.4 p. c.)
Sind . . .	57,000 (19 p. c.)	33,900 (17.5 p. c.)
Madras . . .	41,000 (14 p. c.)	43,900 (22.6 p. c.)
Burma . . .	24,000 (9 p. c.)	18,900 (9.7 p. c.)

The following table taken from the *Review of the Trade of India in 1933-34* gives the figures for imports of sugar for the six years 1928-29 to 1933-34, as compared with the pre-war year 1913-14:—

TABLE XII.—Imports of Sugar, all kinds, excluding Molasses.

Countries from which Imported.	1913-14 (Pre-war year).	1928-29.	1929-30.	1930-31.	1931-32.	1932-33.	1933-34.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
United Kingdom . . . . .	900	4,800	59,300	8,400	22,900	34,900	36,700
Ceylon . . . . .	100	4,000	3,600	5,700	1,100	100	..
Java . . . . .	583,000	850,800	781,100	809,700	366,800	294,800	194,400
Mauritius . . . . .	139,600	..	..	..	..	..	..
Straits Settlements . . . . .	2,900	900	600	500	400	200	200
China and Hongkong . . . . .	1,500	2,100	6,100	5,100	5,000	2,200	3,400
Egypt . . . . .	100	..	..	..	..	..	..
Japan . . . . .	100	300	500	..	100	4,000	3,500
Germany . . . . .	700	300	15,200	11,700	15,400	300	..
Austria . . . . .	74,000	..	1,400	..	400	..	..
Hungary . . . . .		2,100	36,500	13,800	600	..	1,700
Netherlands . . . . .	..	1,600	2,500	600	600	500	1,300
Belgium . . . . .	..	300	1,800	300	200	2,500	1,900
Czechoslovakia . . . . .	..	400	9,700	600	1,100	500	..
United States . . . . .	..	200	200	200	300	..	..
Other Countries . . . . .	100	1,000	21,100	44,600	101,200	29,500	18,200
TOTAL—ALL COUNTRIES . . . . .	803,000	868,800	939,600	901,200	616,100	369,500	261,300
Value—(Rs. lakhs) . . . . .	14,29	15,86	15,51	10,54	6,01	4,12	2,70

(d) *Imports of Sugar by Land.*—The imports of foreign refined sugar from countries situated on India's borders were insignificant. A portion of the foreign sugar imported into Kathiawar ports enters British Territory across the land customs line at Viramgam and Dhandhuka. The quantity so imported during the year was 26,270 tons against 34,357 tons in the preceding year.

(e) *Re-exports.*—The re-exports of sugar from India showed a considerable increase having risen from 4,043 tons valued at Rs. 5,02,527 in 1932-33 to 11,526 tons valued at Rs. 7,25,602 in 1933-34.

The following table gives the details of the re-exports for the last two years 1932-33 and 1933-34 :—

TABLE XIII.—*Re-exports of Sugar from British India.*

	QUANTITY.		VALUE.	
	1932-33.	1933-34.	1932-33.	1933-34.
	Tons.	Tons.	Rs.	Rs.
<i>Sugar 23 D. S. and above—</i>				
To Iraq . . . .	36	105	4,150	16,530
„ Arabia . . . .	1,441	1,491	1,78,581	3,72,090
„ Persia . . . .	..	488	30	85,075
„ Kenya Colony Zanzibar and Pemba. . . .	366	113	46,561	24,875
„ Other Countries . . . .	2,193	801	2,70,975	1,63,279
TOTAL . . . .	4,036	2,998	5,00,297	6,61,849
<i>Sugar below 23 D. S. but not below 16 D. S.</i>	7	..	2,280	..
<i>Sugar 15 D. S. and below</i>	..	8,528	..	63,753
TOTAL OF SUGAR . . . .	4,043	11,526	5,02,527	7,25,602

(f) *Exports by Land of Refined Sugar.*—Exports through Indian and Burmese frontiers amounted to 33,110 tons in the year under report as against 27,729 tons in the preceding year.

(g) *Consumption (or Distribution).*—The sugar required for consumption is partly imported (by land and by sea) and partly manufactured in the country from cane and *gur* in modern factories and by indigenous methods in *Khandsari* concerns. Details of the quantities of sugar available for consumption in India during 1933-34 are given below :—

Total Gross Supply.	Tons.
Initial stocks on 1st April, 1933 . . . .	22,316
India's Production of Sugar of the previous year (1932-33) for consumption during 1933-34—	
(a) Direct from cane . . . .	290,177
(b) Refined from <i>gur</i> . . . .	80,106
(c) Made by indigenous process . . . .	275,000
Imports of Sugar by—	
Sea . . . . .	261,299
Land . . . . .	26,270
Total Supply . . . .	955,168

Quantity to be deducted.	
Re-exports of sugar by sea . . . .	11,526
Exports of sugar by sea . . . .	425
Exports of sugar by land . . . .	33,110
Closing stocks on 31st March, 1934 . . . .	25,350

Total to be deducted . . . .	70,411
Net quantity available for consumption in 1933-34 . . . .	884,757
As against . . . . .	895,280
in 1932-33.	

A consolidated statement showing the sources of supply of sugar required for consumption in India from 1924-25 to 1933-34 is given in Table XIV :—

TABLE XIV.—*Sources of Supply of Sugar required for Consumption in India.*

	1924-25.	1925-26.	1926-27.	1927-28.	1928-29.	1929-30.	1930-31.	1931-32.	1932-33.	1933-34.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Total Gross Supply—										
Initial Stock . . . .	27,368	98,500	43,460	118,000	58,270	113,000	90,500	157,862	67,878	22,316
India's production of sugar of the previous year for consumption in the next year :—										
(a) Direct from cane . . . .	38,312	33,805	52,990	62,941	67,684	68,050	89,768	119,859	158,581	290,177
(b) Refined from <i>gur</i> . . . .	56,406	33,593	38,409	58,085	52,055	31,038	21,150	31,791	69,539	80,106
(c) Made by indigenous process. . . .	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	250,000	275,000
India's imports of sugar by sea. . . .	670,965	732,600	826,900	725,800	868,800	939,584	901,200	516,083	369,450	261,299
India's imports of sugar by land. . . .	51	..	..	50,000	78,780	105,840	114,758	59,564	34,357	26,270
TOTAL SUPPLY . . . .	913,102	1,098,498	1,161,759	1,214,826	1,325,595	1,457,512	1,417,376	1,085,159	940,805	955,168
Re-exports of sugar by sea . . . .	21,990	16,390	12,000	19,800	10,180	7,300	3,370	5,630	4,043	11,526
Exports of sugar by sea . . . .	1,058	600	627	756	640	275	493	220	437	425
Exports of sugar by land . . . .	12,497	26,560	31,830	34,470	36,970	34,514	40,066	28,885	27,729	33,110
Closing stocks . . . .	98,500	43,460	118,000	58,276	113,000	90,500	157,862	67,878	22,316	25,350
TOTAL TO BE DEDUCTED . . . .	134,045	87,010	162,457	113,302	160,790	132,589	201,791	102,619	54,625	70,411
Net quantity available for consumption. . . .	859,057	1,011,488	999,302	1,101,524	1,164,805	1,324,923	125,585	982,540	895,280	884,757

## (3) Molasses.

Imports of molasses amounted to only 2,401 tons valued at Rs. 68,388 in 1933-34 as against 31,991 tons valued at Rs. 10,66,648 during the preceding year. India's own production of molasses is estimated at 457,000 tons during the year 1933-34 as against 461,658 tons last year.

## (4) Confectionery.

The imports of confectionery exclusive of Jams and Jellies amounted to 1,139 tons valued at Rs. 17.49 lakhs compared with 981 tons valued at Rs. 15.30 lakhs during the preceding year.

During the year under review 34,962 lbs. of saccharine valued at Rs. 2.42 lakhs was imported as against 41,496 lbs. worth Rs. 2.31 lakhs in the preceding year.

## VIII.—SUGAR TRADE BY PROVINCES.

## (1) Bengal.

Imports of refined sugar decreased from 88,503 tons valued at Rs. 1.12 lakhs to 27,550 tons valued at Rs. 30.05 lakhs. It is noteworthy that the decrease in imports during the year is about 70 per cent. This is attributed to the larger supplies of home grown sugar. As usual the bulk of the supply was from Java, viz., 22,977 tons. There was no import of beet sugar during the year. Imports of molasses from Java were only 2,380 tons as against 29,580 tons during 1932-33.

The following table shows the imports of sugar in Bengal during the three years 1931-32 to 1933-34 :—

TABLE XV.—Imports of Sugar in Bengal.

Countries from which Imported.	1931-32.		1932-33.		1933-34.	
	Tons.	Value in Rs. Lakhs.	Tons.	Value in Rs. Lakhs.	Tons.	Value in Rs. Lakhs.
<i>Sugar 23 D. S. and above—</i>						
From United Kingdom . . . . .	92	0.28	651	1.95	1,866	2.37
„ Straits Settlements . . . . .	12	0.02	12	0.02	10	0.02
„ Hongkong . . . . .	..	..	7	0.01	160	0.32
„ Czechoslovakia . . . . .	..	..	60	0.19	..	..
„ Germany . . . . .	..	..	10	0.03	..	..
„ Netherlands . . . . .	..	..	30	0.04	40	0.05
„ Java . . . . .	122,820	134.49	85,600	106.72	22,977	23.77
„ China . . . . .	513	0.95	509	1.02	416	0.62
„ Japan . . . . .	..	..	102	0.20	11	0.03
„ Southern Russia . . . . .	14,584	13.86	..	..	..	..
„ Other Countries . . . . .	56	0.09	..	..	..	..
<b>TOTAL</b> . . . . .	<b>138,077</b>	<b>149.69</b>	<b>86,981</b>	<b>110.18</b>	<b>25,480</b>	<b>27.18</b>
<i>Sugar below 23 D. S. but not below 16 D. S.—</i>						
From United Kingdom . . . . .	2	0.01	1	0.01	<i>Negligible</i>	<i>Negligible</i>
„ Straits Settlements . . . . .	3	0.01	34	0.08	..	..
„ Java . . . . .	26,300	24.69	2	..	..	..
„ China (including Hongkong) . . . . .	1,048	2.05	355	0.63	1,445	1.89
„ Japan . . . . .	..	..	1,110	1.87	625	0.97
<b>TOTAL</b> . . . . .	<b>27,353</b>	<b>26.76</b>	<b>1,502</b>	<b>2.59</b>	<b>2,070</b>	<b>2.86</b>
<i>Sugar 16 D. S. and below—</i>						
From United Kingdom . . . . .	4	0.03	1	0.04	<i>Negligible.</i>	
„ Germany . . . . .	..		..			
„ Czechoslovakia . . . . .	3		12			
„ Japan . . . . .	..	..	12	0.03		
„ United States of America . . . . .	169	0.41	20	0.06		
„ Netherlands . . . . .	..	..	13	0.03		
„ Other Countries . . . . .	9	0.04	..	..		
<b>TOTAL</b> . . . . .	<b>185</b>	<b>0.48</b>	<b>67</b>	<b>0.16</b>		
<i>Beet Sugar—</i>						
From Netherlands . . . . .	30	0.04	20	0.02	<i>Nil.</i>	
<i>Molasses—</i>						
From Java . . . . .	37,889	14.52	29,580	9.40	2,380	0.67

The price of Java white sugar in Calcutta was Rs. 10-4-9 per maund on the 1st April, 1933, as compared with Rs. 9-13-0 per maund for Indian sugar on the same date. The market showed a tendency towards weakness and declined to Rs. 10-3-0 for Java and Rs. 9-12-0 for Indian sugar by the end of April. The price for Java ruled steady for the next two weeks ultimately rising to Rs. 10-4-3 on the 19th May. By the 2nd of June the market had advanced to Rs. 10-7-3; but later the rates eased off again and remained steady at Rs. 10-6-3 on the 7th July. The price for Indian sugar at this time was Rs. 10-3-6. As the stock was low, prices considerably improved touching Rs. 10-9-6 for Java and Rs. 10-6-0 for Indian sugar in the first two weeks of August. Stocks having been replenished, there was an easier feeling and the market steadied at Rs. 10-8-6 for Javas for the next five weeks. Thereafter the level was slightly lower till the 20th October; subsequently, with low stocks in the market, prices tended to firm up but the firm tone was not fully maintained on account of offerings of Indian sugar at attractive

rates. The price, therefore, moved downward and after fluctuations touched Rs. 10-7-0 on the 1st December on which date the price of Indian sugar was about Rs. 10-1-0 per maund. The sagging tendency continued further under the influence of large offers of spot supplies of up-country sugar at low prices and by the 12th January the market had moved down to Rs. 9-13-0 for Javas, the price for Indian sugar being Rs. 9-11-0 per maund. The price slightly improved due to the repercussions of the earthquake in Bihar, the market ruling at Rs. 10-2-0 over the first three weeks of March. At the end of the year, a slight weakness appeared, the rates quoted on the 29th March being Rs. 10-1-0 for Javas and Rs. 9-6-0 for Indian white.

## (2) Sind.

The following table taken from the Report on the Maritime Trade of Sind for the official year 1933-34 shows imports, both from foreign countries and from Bombay, re-exports to foreign countries and coast-wise exports of sugar for the past five years:—

TABLE XVI.—*Details of Import and Export Trade in Sugar of Karachi.*

Countries.	1929-30.		1930-31.		1931-32.		1932-33.		1933-34.	
	Tons.	Rs. Lakhs.	Tons.	Rs. Lakhs.	Tons.	Rs. Lakhs.	Tons.	Rs. Lakhs.	Tons.	Rs. Lakhs.
United Kingdom . . . .	21,186	33-38	7,000	7-58	15,142	17-94	22,905	23-96	21,131	21-32
Southern Russia . . . .	..	..	16,267	16-69	21,311	22-05	3,588	3-59	..	..
Poland . . . . .	2,240	2-96	1,403	1-77	4,848	5-59	..	..	..	..
Germany . . . . .	8,089	13-22	6,133	7-10	14,968	17-21	10	0-02	..	..
Netherlands . . . . .	995	1-56	..	..	..	..	..	..	..	..
Belgium . . . . .	518	1-30	314	0-68	171	0-33	121	0-23	1,857	2-93
France . . . . .	3,038	5-14	..	..	..	..	..	..	..	..
Hungary . . . . .	20,303	31-53	12,248	14-18	495	0-54	..	..	1,684	1-64
Czechoslovakia . . . . .	913	1-58	9	0-02	..	..	..	..	..	..
Flume . . . . .	1,006	1-86	..	..	..	..	..	..	..	..
Austria . . . . .	726	1-27	..	..	400	0-47	..	..	..	..
Jugo-Slavia . . . . .	4,908	7-41	..	..	..	..	..	..	..	..
Java . . . . .	156,570	243-16	184,296	214-06	54,857	59-22	56,847	59-38	33,908	33-49
Ecuador . . . . .	..	..	..	..	..	..	5,453	5-38	..	..
Other Foreign Countries .	4	0-01	79	0-15	27	0-06	181	0-31	3,108	3-17
<b>TOTAL . . . . .</b>	<b>220,586</b>	<b>344-38</b>	<b>227,809</b>	<b>262-29</b>	<b>112,219</b>	<b>123-41</b>	<b>89,105</b>	<b>92-87</b>	<b>61,688</b>	<b>62-55</b>
Imports from Bombay . .	2	0-01	1	0-01	2,001	4-06	..	..	..	..
Re-exports . . . . .	1,928	3-41	856	1-19	2,835	3-42	3,487	4-19	1,806	4-09
Exports to Coast Ports .	2,290	5-88	902	2-43	1,011	2-50	1,830	2-06	3,035	7-00

The continued increase of indigenous production stimulated by the high protective duties, is gradually leading to the elimination of foreign sugar. The total quantity imported amounted to only 61,688 tons as against 89,105 tons in the preceding year. The total import was 31 per cent less than that in 1932-33 and was equal to only 27 per cent of the total imports in 1930-31. Decreased consumption due to low purchasing power of the people has also partly contributed to the reduction in the trade in recent years.

The price of white Java, which was Rs. 14-2-0 per cwt. in the beginning of April, rose to Rs. 14-3-6 in the middle of May and to Rs. 14-6-0 in the middle of June, the latter being the highest quotation of the year. It remained more or less steady in July, but thereafter a gradual downward tendency followed, Rs. 13-15-0 being recorded at the end of October. The price further declined to Rs. 13-9-0 at the end of December and to Rs. 13-4-0 (the lowest quotation

of the year) at the end of January, 1934. The next two months witnessed a partial recovery and the quotation stood at Rs. 13-11-8 at the close of the year.

### (3) Bombay.

According to the Report on the Sea-borne Trade of the Bombay Presidency *excluding* Sind, the total import of sugar into Bombay amounted to 98,540 tons as against 111,903 tons in 1932-33, showing a decline to the extent of more than 13,000 tons from the preceding year. Receipts of sugar into Bombay from Java dropped from 86,970 to 74,743 tons during the year. Imports of beet sugar fell by 3,975 tons to 4,804 tons due chiefly to cessation of shipments from Southern Russia, Belgium and Czechoslovakia. Receipts from the Netherlands rose by 831 tons to 1,270 tons. Details of Bombay's imports for 1931-32 to 1933-34 were as under :—

TABLE XVII.—Details of Bombay's Import of Sugar during the Three Years 1931-32 to 1933-34.

Whence Imported.	1931-32.		1932-33.		1933-34.	
	Tons.	Rs.	Tons.	Rs.	Tons.	Rs.
United States of America . . . . .	..	..	..	5	..	52
Germany . . . . .	450	53,310	249	26,968	50	6,000
France . . . . .	..	5	38	3,750	..	..
Italy . . . . .	..	..	..	22	..	..
United Kingdom . . . . .	4,156	5,25,224	54	19,460	3,559	3,69,156
Austria . . . . .	..	10	..	..	..	..
Netherlands . . . . .	407	58,528	439	46,362	1,270	1,35,645
Belgium . . . . .	10	1,998	2,379	2,41,972	10	2,659
Hungary . . . . .	50	5,000	..	..	..	..
Czechoslovakia . . . . .	946	1,28,660	434	49,623	..	..
Hongkong . . . . .	2,724	4,76,185	783	1,70,792	929	1,36,546
Java . . . . .	67,062	73,78,880	86,970	89,15,169	74,743	75,02,064
Poland (including Danzig) . . . . .	8,144	97,60,930	..	..	..	..
Russia . . . . .	47,120	44,26,205	5,251	5,29,893	..	..
Japan . . . . .	..	..	2,636	2,89,950	2,750	3,33,470
Portuguese East Africa . . . . .	..	..	12,652	12,73,325	15,218	15,29,602
Other Countries . . . . .	173	29,270	18	5,058	11	1,823
TOTAL . . . . .	131,242	1,40,59,368	111,903	1,15,72,349	98,540	1,00,17,017
Re-exports . . . . .	2,794	6,84,906	560	83,796	1,135	1,92,939
Exports in Coasting Trade (Foreign) . . . . .	16,592	40,65,110	12,790	32,91,157	11,600	30,55,622

The spot price of Java white was Rs. 15 per cwt. at the end of the last year which gradually declined and with a few fluctuations reached Rs. 14-9-0 in the beginning of May. The price again rose to Rs. 15-2-0, the highest figure of the year, by the end of June. It then gradually fell to Rs. 14-10-3 in the beginning of September but again rose to Rs. 15-2-0 in the beginning of November. A reaction then set in and the price dropped to Rs. 13-9-3, the

lowest figure of the year, by the end of January 1931. Early in March it rose to Rs. 14-8-0 and stood at Rs. 14-4-0 at the end of the year.

#### (4) Madras.

The Report on the Maritime Trade of the Madras Presidency gives particulars of the sea-borne imports of sugar into that Presidency as compared with the previous two years as under :—

TABLE XVIII.—Particulars of Sea-borne Imports of Sugar into the Madras Presidency for 1931-32 to 1933-34.

Sugar.	1931-32.		1932-33.		1933-34.	
	Tons.	Rs. in Lakhs.	Tons.	Rs. in Lakhs.	Tons.	Rs. in Lakhs.
<i>Sugar 23 D. S. and above—</i>						
From Java . . . . .	68,450	110-75	40,817	47-35	43,856	45-61
„ Ceylon . . . . .	962	1-26	76	0-09	5	..
„ United Kingdom . . . .	3,469	4-44	10,171	10-82	9,982	10-48
„ Southern Russia . . . .	5,113	6-69	2,333	2-65	..	..
„ Other Countries . . . .	19	0-04	80	0-16	10	0-04
<b>TOTAL</b> .	<b>78,013</b>	<b>1,23-18</b>	<b>53,477</b>	<b>61-07</b>	<b>53,862</b>	<b>56-13</b>
<i>Sugar below 23 D. S. but not below 16 D. S.—</i>						
From Straits Settlement . . .	..	..	..	..	} 22	0-01
„ Belgium . . . . .	..	..	..	..		
„ China, etc. . . . .	..	..	..	..		
„ Japan . . . . .	..	..	..	..		
„ Java . . . . .	..	..	..	..		
<b>TOTAL</b> .	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>22</b>	<b>0-01</b>
<i>Sugar 16 D. S. and below—</i>						
From Java . . . . .	1	..	..	..	..	..
„ Other Countries . . . .	187	0-22	2	..	..	..
<b>TOTAL</b> .	<b>188</b>	<b>0-22</b>	<b>2</b>	<b>..</b>	<b>..</b>	<b>..</b>
<i>Molasses—</i>						
From Java . . . . .	910	0-65	1,831	1-02	..	..
„ Other Countries . . . .	..	..	..	..	..	..
<b>TOTAL</b> .	<b>910</b>	<b>0-65</b>	<b>1,831</b>	<b>1-02</b>	<b>..</b>	<b>..</b>
<b>GRAND TOTAL</b> .	<b>79,120</b>	<b>1,24-05</b>	<b>55,310</b>	<b>62-09</b>	<b>53,884</b>	<b>56-17</b>

The price of white Java was Rs. 14-5-0 per cwt, in the beginning of April. After a few fluctuations it steadily rose to Rs. 15-0-0 per cwt. in the beginning of June, but thereafter a gradual downward tendency followed, Rs. 14-5-6 being recorded at the end of the month. The price remained more or less steady in July but it further declined in August and September, Rs. 14-2-6 being recorded by the middle of September. The price rose to Rs. 14-14-0 by the middle of October and then again declined to Rs. 13-12-0 at the end of December and to Rs. 13-8-0

on the 18th January, 1934. There was some partial recovery during the next two months and the price stood at Rs. 13-12-0 at the close of the year.

#### (5) Burma.

Imports of refined sugar during the year under review showed a decrease of 6,743 tons. The following table gives the imports of foreign sugar into Burma for the last three years from 1931-32 to 1933-34 :—

TABLE XIX.—Imports of Sugar into Burma.

Description of Sugar.	1931-32.		1932-33.		1933-34.	
	Tons.	Rs. in Lakhs.	Tons.	Rs. in Lakhs.	Tons.	Rs. in Lakhs.
Sugar 16 D. S. and above . . . .	27,946	34.18	26,392	29.57	19,649	21.34
Beet Sugar . . . . .	1	..	..	..	..	..
Sugar 15 D. S. and below . . . .	..	..	..	..	..	..
Molasses . . . . .	239	0.16	182	0.11	21	0.01
<b>TOTAL</b> .	<b>28,186</b>	<b>34.34</b>	<b>26,574</b>	<b>29.68</b>	<b>19,670</b>	<b>21.35</b>

The average price of Java white sugar was Rs. 10-7-0 per maund during the month of April. It remained practically unaltered during May and June but rose to Rs. 10-8-0 in the months of July and August and to Rs. 10-9-0 in September. The price gradually declined to Rs. 9-13-0 per maund in January, 1934, and stood at Rs. 10-3-0 during the month of March, 1934.

#### IX.—MONTHLY SUGAR PRICES.

A statement showing the monthly average price of ready Java white sugar in the principal Indian

ports and of factory made sugar (Cawnpore special) in the Cawnpore market is given below. The latter is a well known grade of sugar refined from *gur* and prices for it have, therefore, been given for comparison with those of Java sugar. In view of the larger production of sugar directly from cane in India, average prices for Marhowrah Crystal No. I (factory delivery basis as quoted in the Cawnpore market) have also been included in the statement. This is a typical first grade sugar as turned out by Indian mills.



TABLE XX.—Statement showing the Monthly Average Price of Ready Java White Sugar per Maund from the year 1933-34.

Month.	Calcutta. Average Price per maund.	Rangoon. Average Price per maund.	Bombay. Average Price per maund.	Karachi. Average Price per maund.	Madras. Average Price per maund.	Cawnpore Special Sugar. (Factory delivery basis, Cawnpore market) Average Price per maund.	Marhowrah Crystal No. 1. Monthly Average Price per maund. (Factory delivery basis, Cawnpore market.)
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
April, 1933 . . .	10 4 0	10 7 0	10 12 0	10 5 0	10 6 0	8 4 0	9 3 0
May, 1933 . . .	10 4 0	10 6 0	10 13 6	10 6 0	10 8 0	8 6 0	9 5 0
June, 1933 ° . . .	10 5 0	10 6 0	10 15 0	10 8 0	10 11 0	8 8 0	9 7 0
July, 1933 . . .	10 7 0	10 8 0	10 13 6	10 8 0	10 8 0	8 7 0	9 10 0
August, 1933 . . .	10 8 0	10 8 0	10 12 0	10 6 0	10 8 0	8 6 0	9 14 0
September, 1933 . . .	10 8 0	10 9 0	10 12 0	10 6 0	10 7 0	8 6 0	9 13 0
October, 1933 . . .	10 8 0	10 8 0	10 12 0	10 5 0	10 11 0	8 4 0	9 9 0
November, 1933 . . .	10 9 0	10 5 0	10 14 0	10 3 0	10 5 0	8 3 0	9 0 0
December, 1933 . . .	10 3 0	10 1 0	10 7 0	10 0 0	10 2 0	8 1 8	9 0 0
January, 1934 . . .	10 1 0	9 13 0	10 1 0	9 11 0	10 0 0	7 8 0	8 14 0
February, 1934 . . .	10 5 0	9 14 0	10 5 0	9 13 0	10 0 0	7 12 0	9 0 0
March, 1934 . . .	10 2 0	10 3 0	10 8 0	10 0 0	10 0 0	8 4 0	9 1 0

## X.—REVIEW OF THE SUGAR TRADE OF JAVA.

A review of the Sugar Trade in Java for the year under report will be of interest as Java is still the supplier of a large quantity of sugar to India.

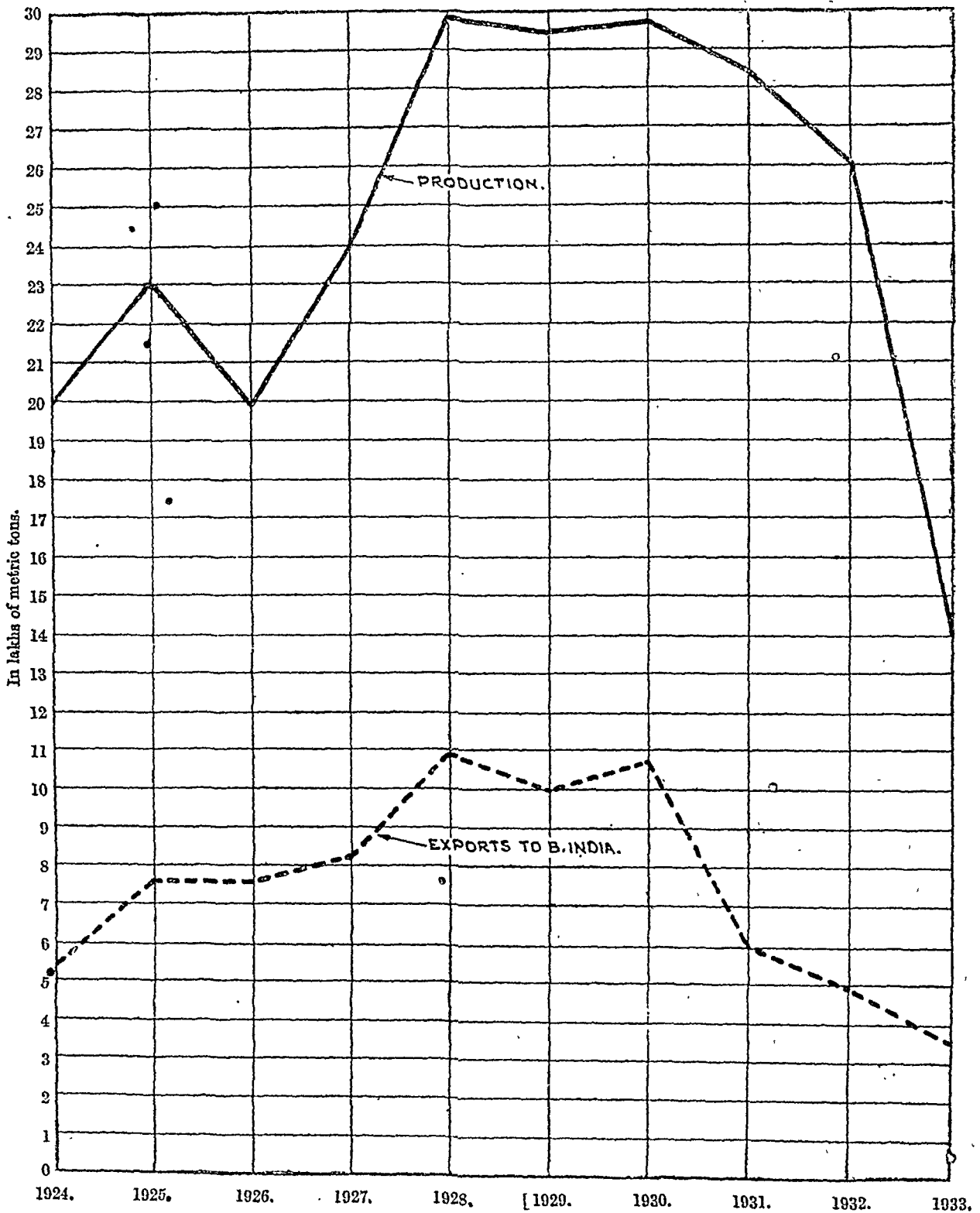
The final figures for the production of sugar in Java in 1933 were:—

	Metric Tons.
Superior Head Sugar . . .	1,083,073
Superior Soft Sugar . . .	9,400
Brown Sugar . . .	241,632
Molasses Sugar . . .	67,222
Total . . .	1,401,327

Against { 2,610,500 metric tons in 1932.  
2,843,652 metric tons in 1931.

The sugar industry in Java could not show any improvement during the year under report. It had again to face difficulties similar to those of the previous year. Java has suffered a tremendous shrinkage in her Far Eastern outlets partly on account of the severe competition from other suppliers and principally by reason of the increase in the production of British India. Figures for the last 10 years relating to the production of sugar in Java, the exports of sugar from Java to British India and the percentage of exports out of total production are shown in the following graphs:—

GRAPH D.—SHOWING THE TOTAL PRODUCTION OF SUGAR IN JAVA AND THE EXPORTS OF SUGAR FROM JAVA TO BRITISH INDIA FROM 1924 TO 1933.



GRAPH E.—SHOWING THE PERCENTAGE OF EXPORTS TO BRITISH INDIA OUT OF PRODUCTION OF SUGAR IN JAVA FROM 1924 TO 1933.



From 1st January, 1933, the Nederlandsch Indische Vereeniging Voor den Afzet Van Suiker, or as commonly abbreviated the "NIVAS" took over the machinery of the late "V. J. S. P." in Soerabaya. Starting on January 1st with stocks of about 2,800,000 tons, to which must be added the 1,401,000 tons made in 1933, they disposed of about 1,624,000 tons during the year, leaving an unsold balance of about 2,577,000 tons on December 31st. It is a credit to the "NIVAS" that they could manage to dispose of these quantities of sugar during the year in spite of the fact that prices for Java Whites declined by about f. 1 per 100 Kg., from the commencement of the year. Early in the year it was necessary to make some concessions in the price of Whites to destinations where British refined sugar was competing. But towards the end of February the com-

petition lessened and the price of Whites was placed on one level for all destinations.

In the beginning of the year the prices were ruling as under:—

Whites: "Free" export . . . . .	f. 5.75
Colombo and Indian West Coast ports . . . . .	f. 5.25
Browns—	
"Free" export . . . . .	f. 5.50
To refiners . . . . .	f. 4.00

The policy adopted by the "NIVAS" was to make sales as rapidly as possible. Good quantities were disposed of during the first two months so that by the end of February about 530,000 tons were sold. Prices were well maintained, and Browns to refiners, opening at f. 4 rose to f. 4½ in March, while Whites,

on which concessions had also been given, rose to f. 5.75 for all destinations East of Suez. At this price fair business was done and the "NIVAS" could make a further rise to f. 5½ with premiums for forward deliveries. By the beginning of the campaign the "NIVAS" had disposed of 802,296 tons of the 1931 and 1932 crops. The market, however, remained very dull, and the "NIVAS" had to make a slight adjustment in prices for export sugar. By the end of May it had disposed of about 908,000 tons. The balance of the 1931 crop of Browns was sold to refiners at 4.50 glds. so that only 145,000 tons of Whites out of that crop remained to be sold.

During June about 100,000 tons were sold at practically unchanged prices for destinations East of Suez. The price to the West of Suez steadily increased to f. 5.10 for nearby deliveries, while f. 5.40 was paid for December/January delivery.

In July also about 100,000 tons were sold out of which 30,000 tons Whites were from the 1931 crop. On 1st August 47,000 tons molasses sugar were sold. The unsold balances consisting of Whites and Browns were as under :—

	Tons.
1932 Crop—	
Whites . . . . .	1,051,000
Browns . . . . .	732,000
1933 Crop—	
Whites . . . . .	974,000
Browns . . . . .	183,000

Prices then declined steadily and very small business could be done owing to a decline in values in New York and London. The "NIVAS" in order to stimulate business, announced their intention of again offering reductions in price for Whites to specified destinations. A rebate of f. 0.75 was offered to Indian West Coast Ports, and f. 0.25 to Indian East Coast Ports, but owing to heavy declines in London and New York little business could be done, so that a week or so later a further concession of f. 0.25 was necessary to attract buyers.

In the 1st week of September "NIVAS" price ideas were again advanced for Whites, but the decline in sterling prevented buyers from following the rise until on the 12th of that month. Sterling advanced sharply and fair lots of Whites could be sold at f. 5.25 and f. 5 for Indian East and West Coast Ports, respectively. At the same time Browns were sold to Japan at f. 4.20. The following week saw a further decline in sterling and concessions were again offered, so that at the end of September prices were as follows :—

Whites—	
"Free Export" . . . . .	f. 5.40
China . . . . .	f. 5.12½
India—	
West Coast . . . . .	f. 4.65
East Coast . . . . .	f. 4.00
Browns—	
China . . . . .	f. 4.75
Japan for refiners . . . . .	f. 3.85

During October the market remained quiet, while during November further reductions were made, 10,000 tons Whites being sold towards the end of the month to exporters at f. 4.60 and f. 4.40 for Indian East and West Coasts, respectively. At this price fair business was done, forward sales being made at a discount of 5 cents, while Browns were sold to Japanese refiners at 3.75 to 3.85.

December was extremely quiet, only about 70,000 tons changing hands during the whole month, the most important transaction being one of 20,000 tons to India at a considerable drop on the previous price. The price paid was f. 4 and f. 4.10 to Indian West and East Coasts. During the month the price for Browns to Japanese refiners was also lowered and unimportant lots were sold at f. 3.60.

Prices at the end of the year were as follows :—

Whites—	
"Free Export" . . . . .	f. 5.50
India—	
West Coast . . . . .	f. 4.00
East Coast . . . . .	f. 4.10
China . . . . .	f. 4.75
Browns—	
"Free Export" . . . . .	f. 5.10
China . . . . .	f. 4.50
India . . . . .	f. 3.75

During the 1st week of January, 1934, about 29,000 tons were disposed of by the "NIVAS" of which 2,000 tons were Browns. There was very little activity during the rest of the month on account of the drastic fall in sterling rates. In spite of the heavy fall in sterling exchange sales were more satisfactory in February and March and the "NIVAS" was able to make a slight advance in prices.

The statistical position of Java on 1st April, 1934, was as under :—

	Tons.
Estimated carry-over on 1st April, 1933	2,532,638
Crop, 1933 . . . . .	1,401,327
Total Supply . . . . .	3,933,965
Deduct—	
Exports April, 1933, to March, 1934 . . . . .	1,108,122
Home Consumption . . . . .	306,224
Total . . . . .	1,414,346

Balance of Supply as on 1st April, 1934	2,519,619
At the same period during 1933 . . . . .	2,532,638
At the same period during 1932 . . . . .	1,634,102
At the same period during 1931 . . . . .	705,827

Details showing destination of export of Java sugar during the official year 1933-34 as compared

with those for the two preceding years are given below :—

TABLE XXI.—*Exports of Sugar from Java during the years 1931-32 to 1933-34.*

Destinations.	1931-32.	1932-33.	1933-34.
	Tons.	Tons.	Tons.
Holland . . . . .	10,913	2,159	17,559
England . . . . .	49,932	270,144	48,811
Germany . . . . .	298	418	2,714
France . . . . .	27,058	19,415	2,417
Belgium . . . . .	2,032	2,529	1,437
Port Said f.o. . . . .	41,039	36,719	62,053
Italy . . . . .	4,166	2,032	914
Egypt . . . . .	..	288	3,018
<b>Total Europe . . . . .</b>	<b>135,438</b>	<b>333,704</b>	<b>138,953</b>
U. S. Atlantic Coast . . . . .	..	..	..
U. S. Pacific Coast . . . . .	50	1,817	818
<b>Total America . . . . .</b>	<b>50</b>	<b>1,817</b>	<b>818</b>
Aden . . . . .	7,651	2,742	7,981
Africa . . . . .	1,629	6,365	5,829
Arabia . . . . .	1,499	899	1,510
Persia . . . . .	5,400	51	111
Singapore . . . . .	63,923	58,933	48,864
Penang . . . . .	26,954	17,475	20,911
British Malaya . . . . .	13,467	11,937	1,923
British India . . . . .	514,714	425,727	320,639
Siam . . . . .	35,048	33,181	29,442
Hongkong . . . . .	351,466	204,100	187,854
China . . . . .	180,526	91,022	83,312
Japan . . . . .	123,405	62,262	137,177
Formosa . . . . .	1,909	15,688	22,387
Korea . . . . .	4,030	4,002	20,011
Australia . . . . .	181	159	153
New Zealand . . . . .	70,245	46,487	70,338
Saigon . . . . .	3,487	1,151	2,969
Vladivostock . . . . .	102	11,092	..
Dairen . . . . .	102	130	3,440
Philippines . . . . .	183	34	..
Polynesio . . . . .	1,406	1,329	1,535
British North Borneo . . . . .	193	759	529
Portuguese Timor . . . . .	136	392	100
Others . . . . .	9	35	118
<b>Total Eastern . . . . .</b>	<b>1,407,665</b>	<b>995,952</b>	<b>967,133</b>
<b>GRAND TOTAL . . . . .</b>	<b>1,543,153</b>	<b>1,331,473</b>	<b>1,105,904</b>

For the period 1933-34 shipments to West of Suez were 139,771 tons as against 335,521 tons for the previous year. Considerable reductions also took place in Java trade in India and in the Far Eastern markets. Shipments to British India totalled 320,639 tons in 1933-34 as against 425,727 tons and 514,714 tons in 1932-33 and 1931-32, respectively. Shipments to Hongkong and China ports totalled 271,166 tons against 295,122 tons and 531,992 tons in 1932-33 and 1931-32, respectively.

The year 1933 witnessed a drastic reduction in the Sugar Industry of Java. Only 99 factories were active in Java during the year as against 166 in the preceding year. 208,947 acres were planted and

harvested during the year 1933 as against 423,924 acres in 1932. The total amount of cane harvested was 11,088,662 tons as against 22,587,839 tons last year. Average tonnage of cane amounted to 52.21 tons per acre; the highest figure for one group reported was 58.80 tons per acre, while the lowest reported was 48.66 tons per acre.

The sugar content of the cane was much better than that in the previous season, the average sugar extraction attained being 12.64 as against 11.16 last year. The highest recovery during 1933 for a group was 13.17 per cent while the lowest was 10.75 per cent. The largest average yield of sugar per acre for a group was reported to be 15,693 lbs. and the lowest 12,922 lbs. as against 15,051 lbs. and 11,500 lbs., respectively, in the previous year. The maximum figure for one single factory amounted to 18,164 lbs. sugar per acre, as against 20,452 lbs. in the year 1932.

The table below gives the number of factories operating and the cane acreage in Java from 1924 to 1933 according to figures published by Dr. Prinsen Geerligs :—

TABLE XXII.—*Number of Factories operating and the Cane Acreage in Java.*

Year.	Number of Factories operating.	Area under Cane.	Cane harvested in tons per acre.
		Acres.	Tons.
1924 . . . . .	179	424,945	42.36
1925 . . . . .	179	430,695	43.19
1926 . . . . .	178	444,038	42.08
1927 . . . . .	178	455,806	46.04
1928 . . . . .	178	481,863	52.53
1929 . . . . .	179	486,799	49.59
1930 . . . . .	179	489,984	51.54
1931 . . . . .	178	493,721	52.70
1932 . . . . .	166	423,924	53.25
1933 . . . . .	99	208,947	52.21

#### XI.—REVIEW OF THE SUGAR TRADE OF CUBA.

The Sugar Trade in Cuba during the year 1933 was influenced by several developments such as the inflationary policy of the United States Government with its accompanying withdrawal from the gold standard; the attempt at the formation of a sugar stabilization plan including crop restriction and marketing agreements among the domestic sugar producers; the possibility of some reduction in Cuban duty and finally the overthrow of the Machado Government in Cuba.

Under inflation, and the effects of the proposed marketing agreement, prices rose to the highest point of the year, viz., 1.65 cents per lb. for raws on the 12th July, 1933. The scheme was, however, finally abandoned as it was found impossible to devise a satisfactory method of allotting sugar crops.

The year opened with a quotation of 0.77 cents per lb. for Cuban raws, cost and freight to New York. The price advanced to 0.80 cents on account of good demand from refiners, their stocks being comparatively small. An easier tone followed due to competition from Philippine sellers and by the middle of January the price eased off to 0.67 cents per lb. for prompt shipments. Refiners were showing more interest in Philippines. The trend continued downward and sugars sold at the lowest point for the year at 0.65 cents per lb. on February 2nd, 1933. A prominent English refiner bought heavily during February of Cubas, San Domingoes, Mexicans and Prefentials which caused an advance in the world's price of raws. At this time it was officially stated that the Java crop for 1934 was to be reduced to 500,000 tons and this also helped considerably to bring prices up to 0.85 cents per lb.

Political conditions in Cuba became of increasing importance during March and finally caused an advance in price of raws to 1.05 cents during the month. Towards the end of the month demand for raws slackened and prices fell to 0.95 cents.

In April, the market was increasingly affected by reports from Washington regarding a possible marketing agreement in sugar, as well as Cuban political developments. With a few fluctuations, the quotation steadily advanced from 0.95 cents at the opening of the month to 1.30 cents. Cuban holders remained out of the market owing to the prospects of receiving some duty concession as a part of the marketing plan under consideration at Washington. With Cuba out of the market, Southern refiners found considerable difficulty in obtaining supplies and had to frequently outbid the Northern refiners to obtain sugars. Some Cubas were occasionally shipped and sold to refiners at a premium over duty frees.

During early May, the market rose up to 1.40 cents and then gradually declined. Refiners were obtaining sufficient raws for their immediate requirements and this caused a slackening in the demand for prompt sugars and the price declined to 1.27 cents per lb. During this month the United States went off the Gold Standard and this caused an important advance on the Exchange but this did not affect actual raws to the full extent owing to the heavy arrivals.

Influenced by advices from Washington in connection with the marketing agreement the prices rapidly rose until 1.50 cents was touched during the first week of the month of June. But about this time difficulty was experienced in getting the various sugar interests together, particularly as far as crop allotments were concerned, and it was also found that it would not be possible to give a reduction in duty to Cuba without lowering the price of domestic beet granulated. These conditions brought about increased selling and the price for raws steadily declined to 1.35 cents. During the latter part of

the month, there was a general meeting of sugar interests in Washington for arriving at a compromise acceptable to all parties. The market responded quickly and the price again advanced to 1.50 cents per lb.

During July the market steadily advanced from 1.30 cents to 1.65 cents, the latter being the highest price for the year. A reaction then set in and the price dropped to 1.50 cents. The buying continued steadily and did not cease until it began to be certain that hopes of reaching an agreement on the marketing plan were dissipated.

During August, political conditions in Cuba became more serious and President Machado was forced to resign and leave Cuba; this caused a severe decline in futures on the Exchange. Lack of offerings and shipments from Cuba brought about a scarcity of nearby sugars and refiners were forced to pay higher price for prompt shipments. The price advanced from 1.44 cents to 1.56 cents. In the beginning of September there was sufficient demand from refiners and sales were made of prompts at 1.65 cents per lb.

Towards the middle of the month of September the offerings from Cuba increased largely and this led to an easing off of the market and prices gradually declined to 1.53 cents at the end of September. Conditions in Cuba had an important influence on the market though shipments appeared to have been made without difficulty. Philippine holders, in spite of the fact that they had a much larger crop than in the previous year, showed an unwillingness to sell.

October was a month of steadily declining prices. Increasing competition in refined, with new crop domestic beets appearing on the market, caused a slackening of the demand from refiners for raws and the month, which opened at 1.53 cents declined at the end to 1.20 cents.

On account of continuous lack of demand for raws the prices declined to 1.15 cents at the end of November. Liquidation of the December delivery on the Exchange had an important effect on the decline. There was much uncertainty as to what would happen in Cuba in 1934, owing to unsettled political and labour difficulties. Philippine holders, who had been reluctant sellers previously, entered the market during the last half of November and sold heavily for December, January and February shipments at 3.15 cents to refiners and operators.

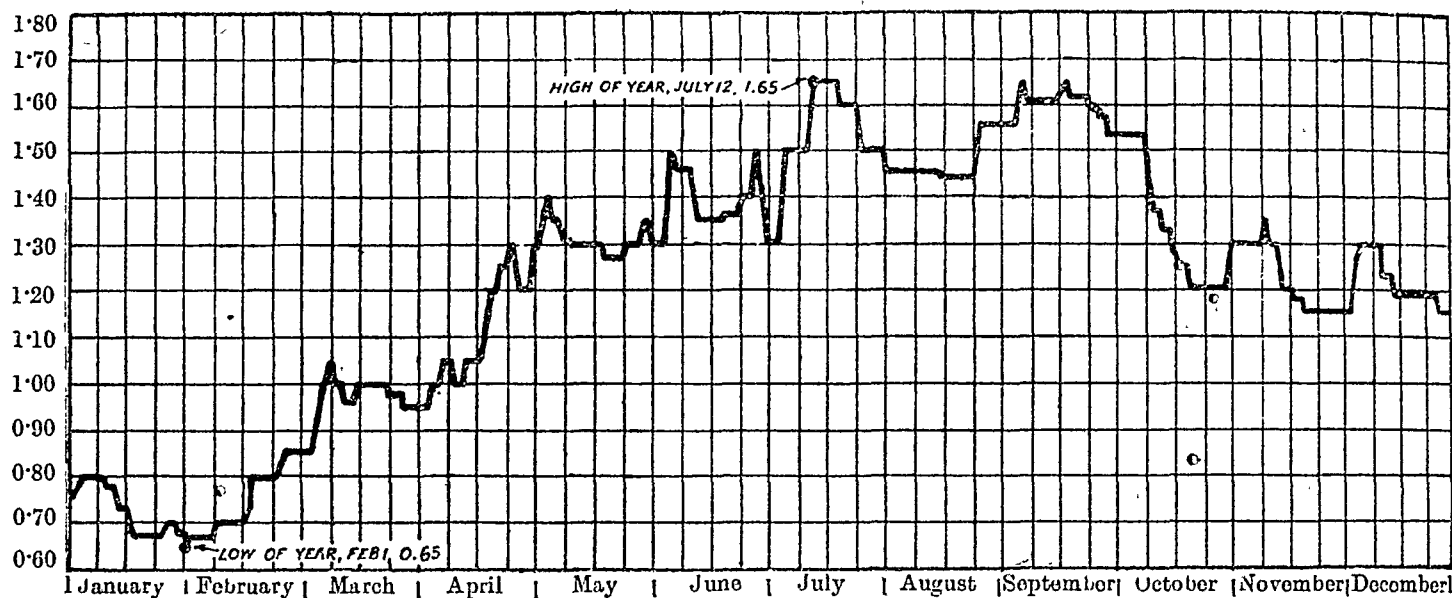
During the month of December the price for raws advanced from 1.15 cents to 1.30 cents and when the refiners' wants were filled the price again declined to 1.15 cents at which price the year closed.

The average price of raw sugar, cost and freight at New York, for the month of January, 1934, was 1.20 cents per lb. This compares with an average price of 0.72 cents per lb. for January, 1933, and 1.21 cents per lb. for December, 1933. The average prices for raws during the months of

February and March, 1934, were 1.33 cents and 1.11 cents, respectively.

Graph F shows the range of sugar prices for raws, cost and freight, New York, during the year 1933.

GRAPH F.—SHOWING THE RANGE OF SUGAR PRICE FOR RAWs, C. & F. NEW YORK DURING THE YEAR 1933.  
(PRICE IN CENTS PER LB. DUTY-FREE.)



The range between the high and low prices of the year in the raw sugar market was 100 points, or a full cent a pound, compared with a swing of 63 points in 1932 and 44 points in 1931. The high peak of the year was 1.65 cents per lb. for Cuban raws C. and F. New York, and the low point was 0.65 cents per lb.

President Grau of Cuba issued a decree on December 30th, 1933, fixing the 1934 Cuba crop at 2,315,459 tons of which 1,500,000 tons was allocated to the United States, 665,459 tons to Europe, and the balance 150,000 tons for local consumption.

The table below shows the production of sugar, the number of centrals operating in Cuba, and the consumption of sugar in the United States from 1925 to 1933 :—

TABLE XXIII.—*Sugar Production in Cuba from 1925 to 1933.*

Year.	Centrals operating.	Sugar Produced (long tons, Raw Sugar).	United States' Consumption of Sugar.	Percentage of Cuban Sugar entering United States' Consumption.
				Per cent.
1925 . . .	183	5,125,000	5,510,000	53
1926 . . .	177	4,885,000	5,671,000	58
1927 . . .	177	4,505,000	5,297,000	55
1928 . . .	172	4,012,000	5,543,000	47
1929 . . .	163	5,159,000	5,811,000	52
1930 . . .	157	4,671,000	5,599,000	44
1931 . . .	140	3,122,000	5,475,000	37
1932 . . .	133	2,603,000	5,214,000	28
1933 . . .	125	1,995,000	5,270,000	25

(Figures taken from "Annual Reports of the American Sugar Refining Company, 1933.")

## XII.—A GENERAL SURVEY OF WORLD SUGAR POSITION IN THE YEAR 1933-34.

According to the latest estimate of Dr. Gustav Mikusch, the world production of sugar in 1933-34 totalled 26,719,000 metric tons as compared with 25,719,000 metric tons in the previous year. The production thus shows an increase of 1,226,000 metric tons over the preceding year. The table below shows the production of sugar (beet and cane) in different countries for the years 1933-34 and 1932-33 for comparison :—

TABLE XXIV.—*Estimate of the World Sugar Production by Dr. Gustav Mikusch, Vienna—Campaign Year September-August.*

	1933-34.	1932-33.
In 1,000 Metric Tons, raw value.		
<b>A.—Beet Sugar.</b>		
<i>(a) Europe.</i>		
Germany . . . . .	1,429	1,091
Danzig . . . . .	26	22
Czechoslovakia . . . . .	517	634
Austria . . . . .	170	165
Hungary . . . . .	136	103
France . . . . .	946	1,022
Belgium . . . . .	247	285
Netherlands . . . . .	290	240
Poland . . . . .	342	417
Denmark . . . . .	254	192
Sweden . . . . .	305	235

	1933-34.	1932-33.
	In 1,000 Metric Tons, raw value.	

## A.—Beet Sugar—contd.

## (a) Europe—contd.

Italy	300	319
Spain	242	260
Jugoslavia	75	85
Rumania	145	53
Bulgaria	45	29
Switzerland	9	7
United Kingdom	523	373
Irish Free State	35	27
Finland	7	6
Latvia	35	27
Lithuania	9	18
Turkey (European and Asiatic)	73	31
Azores	3	3

Total Europe, Soviet Union  
excluded.

Soviet Union

Total Europe

## (b) America.

United States	1,648	1,363
Canada	66	67
Argentina	4	4
Uruguay	1	1
Total America	1,719	1,435

## (c) Asia.

Japan (Hokkaido)	26	27
Korea	7	5
Manchuria	1	3
Persia		
Total Asia	34	35

## (d) Australia.

Victoria (Maffra)	6	6
Beet Sugar Production	8,962	7,896

## B.—Cane.

## (a) Europe.

Spain	15	19
-------	----	----

	1933-34.	1932-33.
	In 1,000 Metric Tons, raw value.	

## B.—Cane—contd.

## (b) America.

Louisiana and Florida		
Porto Rico	233	240
Hawaii	1,010	757
Virgin Islands	936	943
Cuba	5	4
Trinidad	2,340	2,053
Barbados	107	123
Jamaica	90	94
Antigua, St. Kitts, St. Lucia and St. Vincent.	73	56
Martinique and Guadeloupe	55	58
Dominican Republic and Haiti	89	96
Mexico	414	390
Guatemala, Costa Rica, Hon- duras, Nicaragua, San Salva- dor and Panama.	209	190
British Guiana	45	48
Dutch Guiana		
Argentina (1)	144	151
Brazil	19	18
Peru (1)	316	348
Venezuela, Colombia, Ecuador, Bolivia and Paraguay.	969	950
	415	410
	80	90
Total America	7,549	7,019

## (c) Asia.

British India		
Java	4,615	4,174
Japan and Formosa	1,504	2,760
Philippine Islands (2)	803	797
China, Indo-China and Siam	1,434	1,152
	270	270
Total Asia	8,626	9,153

## (d) Africa.

Egypt	154	170
Mauritius	265	251
Reunion	77	54
South African Union	355	326
Mozambique	70	93
Angola, Madeira, Madagascar, Kenya, Uganda, Somaliland, Belgian Congo and Cape Verde.	77	58
Total Africa	998	952

## (d) Australia.

Queensland and New South Wales.	677	541
Fiji Islands	118	139
Total Australia	795	680

Cane Sugar Production

World Sugar Production

(1) Sugar of all grades.  
(2) Muscovados consumed in the Philippine Islands not  
included.

26,945 25,719



It will be observed from the above table that the production of Beet Sugar in Europe increased from 6,420,000 metric tons in 1932-33 to 7,203,000 metric tons in 1933-34 or an increase of 783,000 metric tons over last year.

Another table from the same authority is given below showing the world figures of consumption, imports and exports of sugar in the year 1933-34

as compared with the figures for the previous year. It will be observed that the consumption in the year 1933-34 exceeded the consumption in the previous year by 329,000 metric tons whereas the import figure showed a decrease of 639,000 metric tons, in comparison with the figure for the last year. The export of sugar during the year 1933-34 showed an increase of 67,000 metric tons over the preceding year.

TABLE XXV.—Consumption, Imports and Exports of Sugar in the World by Dr. Gustav Mikusch, Vienna.

	Consumption.		Imports.		Exports.	
	1933-34.	1932-33.	1933-34.	1932-33.	1933-34.	1932-33.
<i>In 1,000 Metric Tons—Raw Sugar Value.</i>						
<i>Europe—</i>						
Germany . . . . .	1,527	1,503	17	21	5	14
Czechoslovakia . . . . .	401	399	..	..	166	280
Austria . . . . .	175	172	4	19	..	..
Hungary . . . . .	93	88	..	..	53	5
Switzerland . . . . .	195	172	188	166	2	1
France . . . . .	1,045	1,060	425	402	298	302
Belgium . . . . .	229	226	114	121	132	139
Netherlands . . . . .	305	333	96	125	77	35
United Kingdom . . . . .	2,244	2,109	2,099	2,179	407	380
Poland . . . . .	324	315	..	..	93	108
Soviet Union . . . . .	(a) 1,000	(a) 960	13	8	47	61
Denmark . . . . .	204	195	1	9	16	1
Sweden . . . . .	282	260	11	35	..	..
Italy . . . . .	325	319	6	5	8	8
Spain . . . . .	302	298	..	..	..	..
Other Countries . . . . .	829	779	476	448	25	15
Total Europe (c) . . . . .	9,480	9,186	3,450	3,538	1,329	1,349
<i>Asia—</i>						
China and Hongkong (a) (b) . . . . .	580	600	360	380	..	..
British India . . . . .	(a) 4,900	4,640	330	456	(a) 40	42
Japan and Formosa (Saipan and Korea included) (b). . . . .	(a) 980	948	(a) 120	150	(a) 150	183
Java . . . . .	323	399	..	..	1,170	1,405
Philippine Islands (d) . . . . .	70	61	..	..	1,369	1,096
Other Countries (b) . . . . .	(a) 457	469	(a) 416	430	(a) 17	(a) 19
Total Asia . . . . .	7,310	7,117	1,226	1,416	2,746	2,745
<i>Africa—</i>						
Egypt . . . . .	128	113	..	1	(a) 40	30
South African Union . . . . .	181	169	1	1	173	163
Mauritius . . . . .	11	11	..	..	(a) 255	241
Other Countries (b) . . . . .	(a) 392	400	(a) 365	369	(a) 188	182
Total Africa . . . . .	712	693	366	371	656	616

(a) Estimated.

(b) Calendar years 1934, respectively, 1933.

(c) The Asiatic territory of the Soviet Union and Turkey included.

(d) Muscovados consumed in the Philippine Islands not included.

TABLE XXV.—*Consumption, Imports and Exports of Sugar in the World by Dr. Gustav Mikusch, Vienna—contd.*

	Consumption.		Imports.		Exports.	
	1933-34.	1932-33.	1933-34.	1932-33.	1933-34.	1932-33.
<i>In 1,000 Metric Tons—Raw Sugar Value.</i>						
<i>America—</i>						
United States . . . . .	5,715	5,899	2,535	2,867	61	38
Hawaii . . . . .	23	22				
Porto Rico, Virgin Islands . . . . .	54	53				
Cuba (b) . . . . .	(a) 160	152	..	..	(a) 2,500	2,477
Canada, Newfoundland (b) . . . . .	(a) 431	427	(a) 373	367	(a) 4	9
British West Indies, Guiana (b) . . . . .	(a) 45	45	(a) 3	3	(a) 404	427
Haiti, Dominican Republic . . . . .	33	28	..	..	(a) (b) 362	(b) 317
Mexico . . . . .	233	211	..	..	..	90
Central America . . . . .	(a) 44	(a) 44	1	1	(a) 4	4
Argentina (c) . . . . .	342	357	..	1	3	1
Brazil . . . . .	(a) 925	(a) 925	..	..	(a) (b) 30	(b) 25
Peru (c) . . . . .	(a) 60	63	..	..	358	320
French West Indies . . . . .	(a) 5	(a) 5	..	..	(a) (b) 82	(a) (b) 91
Other Countries in South America (a) (b). . . . .	223	230	141	147	24	31
<b>Total America . . . . .</b>	<b>8,283</b>	<b>8,461</b>	<b>3,053</b>	<b>3,406</b>	<b>3,835</b>	<b>3,830</b>
<i>Australia—</i>						
Australia (Continent) . . . . .	343	339	(b) ..	(b) ..	(a) (b) 314	(b) 271
Other Countries (b) . . . . .	(a) 77	80	(a) 73	76	(a) 119	121
<b>Total Australia . . . . .</b>	<b>420</b>	<b>419</b>	<b>73</b>	<b>76</b>	<b>433</b>	<b>392</b>
<b>World . . . . .</b>	<b>26,205</b>	<b>25,876</b>	<b>8,168</b>	<b>8,807</b>	<b>8,999</b>	<b>8,932</b>

(a) Estimated.

(b) Calendar years 1934, respectively, 1933.

(c) Sugar of all grades; Calendar years 1933, resp. 1932.

The following table compiled from the figures of Dr. Gustav Mikusch, shows the production and consumption of sugar (cane and beet) and the excess of production over consumption from 1924-25 to 1933-34 :—

TABLE XXVI.—*World Production and Consumption of Sugar (Cane and Beet).*

Year.	Production.	Consumption.	Excess of Production over Consumption.
	Metric Tons.	Metric Tons.	Metric Tons.
1924-25 . . . . .	24,768,000	23,256,000	1,512,000
1925-26 . . . . .	25,923,000	24,712,000	1,211,000
1926-27 . . . . .	24,859,000	24,790,000	69,000
1927-28 . . . . .	26,633,000	25,843,000	790,000
1928-29 . . . . .	28,898,000	27,479,000	1,419,000
1929-30 . . . . .	28,555,000	26,846,000	1,709,000
1930-31 . . . . .	29,579,000	26,939,000	2,640,000
1931-32 . . . . .	27,208,000	26,100,000	1,108,000
1932-33 . . . . .	25,719,000	25,876,000	—157,000
1933-34 . . . . .	26,945,000	26,205,000	740,000

NOTE.—The figures have been revised according to the latest estimate of Dr. Mikusch.

It is a noteworthy feature that consumption in the year 1932-33 exceeded the production by 157,000

metric tons. But in 1933-34 although consumption increased, the production showed a larger increase, with the result that consumption fell short of production by as much as 740,000 metric tons.

### XIII.—CONCLUSION.

In the previous issue of this *Review* mention was made of the probable effect of the excise duty imposed under the Sugar (Excise Duty) Act, 1934, on different sections of the sugar industry. It was stated there that the effect on modern factories manufacturing sugar directly from cane was likely to be to put a wholesome check on the excessive expansion which was taking place and of compelling the existing factories to increase their efficiency and reduce the cost of production. The *Gur* refining and *Khandsari* sections of the industry, being both inefficient and wasteful, were expected to be curtailed. The actual figures now available as well as the forecast of production in the near future have confirmed expectations in both these respects. The putting up of new cane factories has almost come to a stop, whilst many of the existing factories have made, or are contemplating, additions to their plants with the object of increasing their capacity and efficiency and so lowering the cost of production. The production of sugar by *Gur* refineries and *Khandsaris* has shown a marked reduction.

A contributory cause which adversely affected production of sugar in northern India during the current season 1934-35 was the damage suffered by cane crop owing to attacks of pests and diseases and to bad climatic conditions such as uneven distribution of rainfall, floods and frost. As a result of these causes sugar prices were maintained at a higher level than was expected. The improved statistical position in Java and a healthier undertone in the world sugar markets appear to have brought about a definite change for the better in the Indian markets. Added to these is the effect on the market of the definite signs which are now noticeable of an improvement of consumption of sugar in India.

A forecast of sugar production is given in Table XXVII. It should be noted that the estimates of production of sugar from cane are for each cane crushing season, which normally lasts from November to May in northern India.

TABLE XXVII.—*Forecast of Annual Production of Sugar in India up to Cane Crushing Season, 1935-36 (from Cane and Gur).*

Particulars.	Cane Crushing Season, 1933-34 (Actual).	Cane Crushing Season, 1934-35 (Estimated).	Cane Crushing Season, 1935-36 (Estimated).
	Tons.	Tons.	Tons.
1. Production from existing capacity of Old Factories.*	515,000	620,000	620,000
2. Production due to increase in capacity of Old Factories.*	..	..	75,000
3. Production from New Factories commencing manufacturing operations during the season.	..	..	15,000
4. Total Production of Factory Sugar.	515,000	620,000	710,000
5. Estimated Production of Khand-sari Sugar.	200,000	150,000	125,000
6. Total Production of All Kinds of Sugar (excluding Gur).	715,000	770,000	835,000

\* NOTE.—Under "Old Factories" are included all factories excepting those commencing manufacturing operations for the first time during the season.

A forecast of the quantity of sugar available for consumption and of imports of sugar for the official years up to 1936-37 is given in Table XXVIII. It may be explained that the figures for "Margin for Imported Sugar" are exclusive of re-exports and are arrived at after making allowance for differences in opening and closing stocks of imported sugar at ports. The "Gross Imports" would be somewhat higher.

TABLE XXVIII.—*Forecast of Annual Consumption and Imports of Sugar in India up to 1936-37.*

Particulars. †	Official year 1933-34 (Actual).	Official year 1934-35 (Estimated).	Official year 1935-36 (Estimated).	Official year 1936-37 (Estimated).
	Tons.	Tons.	Tons.	Tons.
1. Indian Sugar Production of the preceding cane crushing season.	645,283	715,000	770,000	835,000
2. Consumption of Sugar in India during the official year.	884,757	930,000	930,000	930,000
3. Difference between Production and Consumption representing Margin for Imported Sugar entering into Consumption during the official year.	238,474	215,000	160,000	95,000

A comparison of the estimates of production and consumption contained in the two preceding tables with the corresponding tables published last year clearly brings out the improvement which has taken place now. Whilst it was estimated last year that production would exceed consumption by 1936-37 the reduction in production of refineries and Khand-saris and the slight improvement in consumption, now indicate that such over-production may not take place. The outlook for the industry is, therefore, definitely better to-day.

CAWNPORE,  
25th June, 1935.

### LIST "A".

#### List of Modern Sugar Factories and Refineries existing in India in the Year 1933-34.

Serial No. and Name and Address of Firm.	District.	Location.	Nearest Railway Station.	Capacity.
<b>I.—Factories working with Cane.</b>				<b>Tons.</b>
<b>Punjab.</b>				
1. The Phulerwan Sugar and Oil Mills, Ltd., Phulerwan.	Sargodha	Phulerwan	Phulerwan, N. W. R.	100
2. The Bhalwal Sugar Mills Co., Ltd. (Managing Agents—Captain Malik Sardar Khan Noon, Rais, Tahsil Bhalwal.)	Shahpur	Bhalwal	Bhalwal, N. W. R.	100

## LIST "A"—contd.

## List of Modern Sugar Factories and Refineries existing in India in the Year 1933-34—contd.

Serial No. and Name and Address of Firm.	District.	Location.	Nearest Railway Station.	Capacity.
<b>I.—Factories working with Cane— contd.</b>				<b>Tons.</b>
<b>Punjab—contd.</b>				
3. Gujranwala Sugar Mills Co., Ltd. (Managing Agents—Messrs. Narang Bros. & Co., Ltd., Lahore.)	Gujranwala	Rahwali	Rahwali, N. W. R.	300
4. The Saraswati Sugar Mills (Managing Agents—Messrs. Jallakshmi Sugar Co., Ltd., Doiwala.)	Ambala	Jagadhri	Jagadhri, N. W. R.	400
*5. The Punjab Sugar Corporation, Ltd., Sonapat—near Delhi. (Managing Agents—The Ganesh Flour Mills, Co., Lyallpur and Delhi.)	Rohtak	Sonapat	Sonapat, N. W. R.	300
<b>United Provinces.</b>				
1. Jai Lakshmi Sugar Co., Ltd., Doiwala. (Managing Director—Jishnu Lal, Esq., B.Sc., Doiwala.)	Dehra Dun	Doiwala	Doiwala, E. I. R.	250
2. The Ganga Sugar Corporation, Ltd., Nawa Shahr (Hazara), <i>via</i> Abbottabad. (Managing Agents—The Ganga Sugar Corporation, Ltd., College Road, Rawalpindi.)	Saharanpur	Deoband	Deoband, N. W. R.	600—800
3. The Amritsar Sugar Mills Co., Ltd., P. O. Baheri. (Managing Director—Sardar Amar Singh Sahib, Amritsar.)	Muzaffarnagar	Rohana Kalan	Rohana Kalan, N. W. R.	600—800
*4. The Upper Doab Sugar Mills, Ltd. (Managing Agents—Hari Raj Swarup Rajendra Lal & Bros., Meerut.)	Do.	Shamli	Shamli, S. S. Rly.	600—800
5. The Upper Jumna Swadeshi Sugar Mills Co., Ltd., Mansurpur. (Managing Agents—Messrs. Hari Raj Swarup Rajendra Lal and Bros., Muzaffarnagar.)	Do.	Mansurpur	Mansurpur, N. W. R.	600
6. Upper India Sugar Mills, Ltd., Khatauli. (Managing Agents—Messrs. Mitra Mandal, Burn Bastion Road, Delhi.)	Do.	Khatauli	Khatauli, N. W. R.	600
7. Bhogpur Sugar Factory, Bhogpur, P. O. Najibabad, E. I. R. (Proprietors—Raja Hari Kishan Kaul, 29, Lawrence Road, Lahore, and Ishwar Das Lakshmidas, Hughes Road, Bombay.)	Bijnor	Bhogpur	Najibabad, E. I. R.	50
8. The Dhampur Sugar Mills, Ltd. (Managing Proprietors—H. R. Sugar Factory, Nekkpur.)	Do.	Dhampur	Dhampur, E. I. R.	450—500
9. The Upper Ganges Sugar Mills, Ltd. (Managing Agents—Messrs. Birla Brothers, Ltd., 8, Royal Exchange Place, Calcutta.)	Do.	Seohara	Seohara, E. I. R.	1,100
10. Rai Bahadur Narain Singh Sugar Mills, Ltd., Baraut. (Managing Director—Sardar Ranjit Singh, 2-A, Curzon Road, New Delhi.)	Meerut	Baraut	Baraut, S. S. Rly.	600
*11. The Diwan Sugar Mills, Sakhoti Tanda, P. O. Sakhoti Tanda. (Proprietor—Seth Dhanpatmal Diwan Chand, Lyallpur.)	Do.	Sakhoti Tanda	Sakhoti Tanda	400
*12. Daurala Sugar Works, Daurala. (Proprietors—The Delhi Cloth and General Mills Co., Ltd., Delhi.)	Do.	Daurala	Daurala, N. W. R.	900
*13. The Indra Sugar Works, Ltd., Clement Street, Meerut Cantonment. (Managing Agents—Incharam & Co., Bankers and Agents, Clement Street, Meerut.)	Do.	Maliana	Meerut City, N. W. R.	300

LIST "A"—*contd.*List of Modern Sugar Factories and Refineries existing in India in the Year 1933-34—*contd.*

Serial No. and Name and Address of Firm.	District.	Location.	Nearest Railway Station.	Capacity. Tons.
<b>I.—Factories working with Cane— contd.</b>				
<b>United Provinces—<i>contd.</i></b>				
*14. Delhi Sugar Mills, Ltd. (Managing Agents—Messrs. Krishna Sugar Syndicate, 11, Curzon Road, New Delhi.)	Meerut	Mohiuddimpur	Mohiuddimpur, N. W. R. &	400
15. Modi Sugar Mills, Ltd. (Managing Agents—Messrs. Multani Mal & Sons, Patiala.)	Do.	Begamabad	Begamabad, N. W. R.	500
*16. Simbhaoli Sugar Mills. (Managing Proprietor—Sardar Raghbir Singh Sendhanwalia, O.B.E., P. O. Baksar, Dist. Meerut.)	Do.	Simbhaoli	Simbhaoli, E. I. R.	400
*17. Prag Sugar Factory, Kichha. (Managing Agent—Prag Narain, Vakil, Rawatpara, Agra.)	Nainital	Kichha	Kichha, R. K. R.	600
*18. Khandke Sugar Mills, Ltd., Baheri. (Managing Agents—Messrs. D. N. Khandke & Co., Baheri, Dist. Bareilly.)	Bareilly	Baheri	Baheri, R. K. R.	150
19. The Kesar Sugar Works, Ltd., Baheri. (Managing Agents—Messrs. Kilachand and Devchand & Co., Allahabad Bank Building, Apollo Street, Fort, Bombay, P. O. Box No. 746.)	Do.	Do.	Baheri, R. K. R.	800
20. H. R. Sugar Factory, Nekpur. (Managing Director—Raja Radha Raman.)	Do.	Nekpur	Bareilly, R. K. R.	600
21. Saraswati Sugar Syndicate, Ltd. (Managing Agents—The Neoli Syndicate, P. O. Soron, Dist. Etah.)	Etah	Manpur Nagaria	Manpur Nagaria, R. K. R.	450
22. L. H. Sugar Factories and Oil Mill, Ltd., Pilibhit. (Managing Director—Sahu Jagdish Prasad Jee Sahib, Pilibhit.)	Pilibhit	Pilibhit	Pilibhit, R. K. R.	600
23. L. H. Sugar Factories and Oil Mill, Ltd., Pilibhit. (Managing Director—Sahu Jagdish Prasad Jee Sahib, Pilibhit.)	Do.	Do.	Pilibhit, R. K. R.	450
24. L. H. Sugar Factories and Oil Mill, Ltd., Pilibhit. (Managing Director—Sahu Jagdish Prasad Jee Sahib, Pilibhit.)	Do.	Do.	Pilibhit, R. K. R.	150
*25. The Hindustan Sugar Mills, Ltd., Gola Gokranmath. (Managing Agents—Messrs. Bachraj & Co., Ltd., 395, Kalba Devi Road, Bombay 2.)	Kheri	Gola Gokranmath	Gola Gokranmath, R. K. R.	1,000
26. The Aira Sugar Factory, P. O. Aira Estate, Khamaria. (Owners—The Shree Maha Lakshmi Sugar Corporation, Ltd., Kheri.)	Do.	Khamaria	Lakhimpur, R. K. R.	150
*27. Rosa Sugar Factory and Distillery, Rosa. (Managing Agents—Lyal Marshall & Co., 4, Fairlie Place, Calcutta.)	Shahjahanpur	Rosa	Rosa, E. I. R.	600
28. The Oudh Sugar Mills, Ltd. (Managing Agents—Messrs. Birla Brothers, Ltd., Jahangir Wadia Buildings, Esplanade Road, Fort, Bombay.)	Sitapur	Hargaon	Hargaon, R. K. R.	1,000— 1,200
*29. The Lakshmi Sugar Mills Co., Maholi. (Proprietors—Rai Bahadur Seth Ajudhia Prasad, Honorary Magistrate, Anarkali, Lahore, and Shiv Prasad Banarsidas Agarwal, Bankers and Mill Owners, 85, Lake Road, Lahore.)	Do.	Maholi	Maholi, E. I. R.	400
30. The United Provinces Co-operative Sugar Factory, Ltd., Biswan. (Resident Director—The Hon'ble Rai Bahadur Lala Mathura Prasad Mehrotra, Biswan.)	Do.	Biswan	Biswan, R. K. R.	300

## LIST "A"—contd.

## List of Modern Sugar Factories and Refineries existing in India in the Year 1933-34—contd.

Serial No. and Name and Address of Firm.	District.	Location.	Nearest Railway Station.	Capacity.
<b>I.—Factories working with Cane—</b> contd.				Tons.
<b>United Provinces—contd.</b>				
31. Seth Gulzarimall Kamchand Sugar Mills, Jarwal Road. (Proprietors—Lala Jaswant Rai & Sons, Karachi, and Messrs. Gulzarimall Kamchand, Bankers, Lahore.)	Bahraich	Jarwal Road	Jarwal Road, B. N. W.	400
*32. The Burhwal Sugar Mills Co., Ltd., Burhwal Head Office, Collectorganj, Cawnpore.	Barabanki	Burhwal	Burhwal, E. I. R. and B. N. W.	200
*33. The Lucknow Sugar Works, Ltd., Aishbagh, Lucknow.	Lucknow	Lucknow	Aishbagh, B. N. W.	400
*34. Experimental Sugar Factory of the Harcourt Butler Technological Institute, Cawnpore.	Cawnpore	Nawabganj	Rawatpur, Cawnpore, B. N. & C. I.	..
35. The Balrampur Sugar Co., Ltd. (Managing Agents—Messrs. Begg Sutherland & Co., Ltd., Cawnpore.)	Gonda	Balrampur	Balrampur, B. N. W.	600
36. The Nawabganj Sugar Mills Co., Ltd., Nawabganj. (Managing Agents—Messrs. Narang Brothers & Co., Ltd., 3, Montgomery Road, Lahore.)	Do.	Nawabganj	Nawabganj, B. N. W.	1,100
*37. The Sekseria Sugar Mills, Ltd., Babhnan. (Managing Agents—Messrs. Govind Ram Ramnath & Co., 18, Mullick Street, Calcutta.)	Basti	Babhnan	Babhnan, B. N. W.	500
38. The Basti Sugar Mills Co., Ltd., Walterganj. (Managing Agents—Messrs. Narang, Bros., & Co., Ltd., 3, Montgomery Road, Lahore.)	Do.	Walterganj	Walterganj, B. N. W.	500
*39. The Basti Sugar Mills Co., Ltd., Basti. (Managing Agents—The Hon'ble Sir G. C. Narang, 5, Montgomery Road, Lahore.)	Do.	Basti	Basti, B. N. W.	550
40. Madho Kanhaya Mahesh Gauri Sugar Mills, Ltd., Jagdishpur, P. O. Munderwa.	Do.	Jagdishpur	Munderwa, B. N. W.	400—500
41. The Popular Sugar Co., Ltd., Barhni (Ramdatganj). (Managing Agents—Seth Nadhan Singh & Sons, Gujranwala, Punjab.)	Do.	Barhni	Barhni, B. N. W.	650
42. The Ganesh Sugar Mills, Ltd., Pharenda. (Managing Agents—Messrs. Poddar Jaipuria & Co., Jaipuria House, P. O. Beadon Street, Calcutta.)	Gorakhpur	Pharenda	Pharenda, B. N. W.	500
43. The Lakshmi Devi Sugar Mills, Chitauni. (Managing Agents—Messrs. Agarwal & Co., Post Office, Raja Bazar, Khadda.)	Do.	Chitauni	Chitauni, B. N. W.	400
44. The Vishnu Pratap Sugar Works, Khadda.	Do.	Khadda	Khadda, B. N. W.	500
45. The Ledi Sugar Factory, Ledi, P. O. Nichloul. (Managing Agents—Dr. K. K. Bhargava, Ledi, P. O. Nichloul, Dist. Gorakhpur.)	Do.	Ledi	Siswa Bazar, B. N. W.	75
46. The Mahabir Sugar Mills, Ltd., Siswa Bazar. (Managing Agents—Messrs. Dwarkadas Baijnath, Siswa Bazar, Dist. Gorakhpur.)	Do.	Siswa Bazar	Siswa Bazar, B. N. W.	500
*47. The Punjab Sugar Mills Co., Ltd., Ghughli. (Chairman—Hon'ble Sir G. C. Narang, 5, Montgomery Road, Lahore.)	Do.	Ghughli	Ghughli, B. N. W.	500
48. The Shankar Sugar Mills, P. O. Captainganj. (Managing Agents—Messrs. Indra Chand Hari Ram, Captainganj.)	Do.	Captainganj	Captainganj, B. N. W.	600
49. The Diamond Sugar Mills, Ltd., Pipraich. (Managing Agents—Messrs. Murarka & Sons, Ltd., 15, Clive Street, Calcutta.)	Do.	Pipraich	Pipraich, B. N. W.	450

## LIST "A"—contd.

## List of Modern Sugar Factories and Refineries existing in India in the Year 1933-34—contd.

Serial No. and Name and Address of Firm.	District.	Location.	Nearest Railway Station.	Capacity.
				Tons.
<b>I.—Factories working with Cane—</b>				
<b>contd.</b>				
<b>United Provinces—concl'd.</b>				
50. The Pipraich Sugar Mills, Ltd., Pipraich .	Gorakhpur .	Pipraich .	Pipraich, B. M. W.	200
*51. Saraya Sugar Factory, Sardarnagar. (Senior Managing Partner—Sardar Bahadur Sir Sunder Singh Majithia, Kt., C.I.E., P. O. Sardarnagar, Dist. Gorakhpur.)	Do. .	Sardarnagar .	Sardarnagar, B. N. W.	2,000
*52. Gauri Bazar Factory of the Cawnpore Sugar Works, Ltd., Gauri Bazar. (Managing Agents—Messrs. Begg Sutherland & Co., Ltd., Cawnpore.)	Do. .	Gauri Bazar .	Gauri Bazar, B. N. W.	325
53. Shree Sitaram Sugar Co., Ltd., Baitalpur, P. O. Deoria. (Managing Agents—Messrs. Karamchand Thapar & Bros., Ltd., 5, Royal Exchange Place, Calcutta.)	Do. .	Baitalpur .	Baitalpur, B. N. W.	500—650
*54. Hanumat Sugar Mills, Deoria, P. O. Deoria. (Proprietors—Messrs. Lakshmi Narain Mathura Prasad, Bankers and Cloth Merchants Tahsil Deoria, and others.)	Do. .	Tahsil Deoria .	Tahsil Deoria, B. N. W.	100
*55. Noori Sugar Works, Bhatni. (Proprietors—Messrs. Noori Mian & Co., Bhatni.)	Do. .	Bhatni .	Bhatni, B. N. W.	650
*56. Ishwari Khetan Sugar Mills, Ltd., Lakshmiganj. (Managing Agents—Messrs. Devi Dutt Suraj Mull, Padrauna, Dist. Gorakhpur.)	Do. .	Lakshmiganj .	Lakshmiganj, B. N. W.	650—700
57. Maheshri Khetan Sugar Mills, Ramkola. (Managing Agents—Messrs. Devi Dutt Chaturbhuj, Ramkola.)	Do. .	Ramkola .	Ramkola, B. N. W.	600
58. The Ramkola Sugar Mills Co., Ramkola .	Do. .	Do. .	Do. .	600
*59. Padrauna Raj Krishna Sugar Works, Ltd., Padrauna. (Owned by the Padrauna Raj, Padrauna.)	Do. .	Padrauna .	Padrauna, B. N. W.	882
60. The Jagdish Sugar Works. (Managing Agents—Raja Bahadur Brij Narain Singh and Co., Padrauna.)	Do. .	Kathkuiyan .	Kathkuiyan, B. N. W.	400
*61. The United Provinces Sugar Factory, Bubnowlie, P. O. Seorahi. (Managing Agents—Messrs. James Finlay & Co., Ltd.)	Do. .	Bubnowlie .	Tamkahi Road, B. N. W.	750
*62. The Ratna Sugar Mills Co., Ltd., Shahganj. (Managing Agents—Messrs. Kashi Prasad & Co., Benares Cantonment.)	Jaunpur .	Shahganj .	Shahganj, E. I. R.	500
*63. The Shree Krishna Deshi Sugar Works, Jhusi, Dist. Allahabad.	Allahabad .	Jhusi .	Jhusi, E. I. R.	400
*64. Tribeni Desi Sugar Works, Naini. (Proprietor—Mr. A. Beni Prasad, Naini, Allahabad.)	Do. .	Naini .	Naini, E. I. R. and G. I. P.	200
<b>Bihar and Orissa.</b>				
1. Harinagar Sugar Mills, Ltd., Ramnagar, (Managing Agents—Narayanlal Bansilal, 207, Kalba Devi Road, Bombay.)	Champaran .	Ramnagar .	Harinagar, B. N. W.	800—1,000
2. New Swadeshi Sugar Mills, Ltd., Narkatiaganj. (Managing Agents—Messrs. Birla Brothers Ltd., Jahangirwadia Buildings, 2nd Floor, Esplanade Road, Fort, Bombay.)	Do. .	Narkatiaganj .	Narkatiaganj, B. N. W.	550
*3. Pursa Sugar Factory, Pursa, P. O. Lauriya. (Proprietors—Pursa Co., Ltd., Pursa.)	Do. .	Pakri .	Chanpatia, B. N. W.	425

## LIST "A"—contd.

## List of Modern Sugar Factories and Refineries existing in India in the Year 1933-34—contd.

Serial No. and Name and Address of Firm.	District.	Location.	Nearest Railway Station.	Capacity. Tons.
<b>I. Factories working with Cane— contd.</b>				
<b>Bihar and Orissa—contd.</b>				
4. Chanpatia Factory of the Champaran Sugar Co., Ltd., Chanpatia. (Managing Agents—Messrs. Begg Sutherland & Co., Ltd., P. O. Box No. 21, Cawnpore.)	Champaran	Chanpatia	Chanpatia, B. N. W.	700
5. Motilal Padarnpat Sugar Mills, Co., Ltd., Majhowlia. (Resident Director—Babu Dwarka Das, Majhowlia.)	Do.	Majhowlia	Majhowlia, B. N. W.	450
6. Sagauli Sugar Factory, Sagauli. (Managing Agent—Mohamad Hanif No. 5, Raj Mohan Street, Calcutta.)	Do.	Sagauli	Sagauli, B. N. W.	500
*7. Shree Hanuman Sugar Mills, Ltd., Motihari. (Managing Agents—Messrs. Daulat Ram Rawat Mull, 178, Harrison Road, Calcutta.)	Do.	Motihari	Motihari, B. N. W.	700
*8. Factory of the Champaran Sugar Co., Ltd., Barah Chakia. (Managing Agents—Messrs. Begg Sutherland & Co., Ltd., P. O. Box No. 21, Cawnpore.)	Do.	Barah Chakia	Chakia, B. N. W.	750
*9. Sasa Musa Sugar Works, Sasa Musa, P. O. Moniara. (Proprietor—S. K. Mohamad Ibrahim Sahib, 3, Damzens Lane, Calcutta.)	Saran	Sasa Musa	Sasa Musa, B. N. W.	450
10. Vishnu Sugar Mills, Ltd., Harkhua, P. O. Gopalganj. (Managing Agents—Messrs. Bilas Rai Bansi Lal & Co., Aga Khan Building, Dalal Street, Fort, Bombay.)	Do.	Harkua	Harkua, B. N. W.	450
*11. Shree Krishna Gyanoday Sugar Mills. (Proprietor—Maharaja Bahadur Raj Hathwa, P. O. Hathwa.)	Do.	Mirganj	Hathwa, B. N. W.	800
12. Factory of the Purtabpore Sugar Co., Ltd., Mairwa. (Managing Agents—Messrs. Begg Dunlop & Co., Ltd., 2, Hare Street, Calcutta.)	Do.	Mairwa	Mairwa, B. N. W.	660
*13. Factory of the New Savan Sugar & Gur Refining Co., Ltd., Siwan. (Managing Agents—Messrs. Andrew Yule & Co., 8, Clive Road, P. O. Box No. 150, Calcutta.)	Do.	Siwan	Savan, B. N. W.	500
14. Indian Sugar Works. (Managing Proprietor, Manvi Mohamad Abdul Razzaq, Siwan.)	Do.	Siwan	Savan, B. N. W.	500
*15. Bihar Sugar Works, Pachrukhi. Agents—Messrs. Bakubhai Ambalal & Co., 27, Bastion Road, Fort, Bombay.)	Do.	Pachrukhi	Pachrukhi, B. N. W.	800
*16. Factory of the Maharajganj Sugar Co., Ltd., Maharajganj.	Do.	Maharajganj	Maharajganj, B. N. W.	150
*17. Bharat Sugar Mills, Ltd., Sidhwalia. (Managing Agents—Messrs. Birla Brothers, Ltd., 8, Royal Exchange Place, Calcutta.)	Do.	Sidhwalia	Sidhwalia, B. N. W.	300
*18. Marhowrah Factory of the Cawnpore Sugar Works, Ltd. (Managing Agents—Messrs. Begg Sutherland & Co., Ltd., Cawnpore.)	Do.	Marhowrah	Marhowrah, B. N. W.	850
19. Sitalpore Sugar Works, Ltd. (General Manager—H. K. Ghosh, Esq., C/o Indian Press, Ltd., Allahabad.)	Do.	Sitalpore	Sitalpore, B. N. W.	400
20. The Belsund Sugar Co., Ltd. (Managing Agents—Messrs. James Finlay & Co., Ltd., 1, Clive Street, Calcutta.)	Muzaffarpur	Riga	Riga, B. N. W.	500



## LIST "A"—contd.

## List of Modern Sugar Factories and Refineries existing in India in the Year 1933-34—contd.

Serial No. and Name and Address of Firm.	District.	Location.	Nearest Railway Station.	Capacity.
				Tons.
<b>I. Factories working with Cane—</b>				
contd.				
<b>Bihar and Orissa—concl.</b>				
21. The Motipur Sugar Factory, Ltd., Motipur. (Proprietors—Seth Haji Abdulla Haroon, Karachi and Seth Abdool Rahim Oosman, Calcutta.)	Muzaffarpur	Motipur	Motipur, B. N. W.	900
22. Japaha Sugar Factory, Japaha. (Proprietors—Messrs. Geo. Richardson, E. H. Hudson, S. Richardson and others.)	Do.	Japaha	Muzaffarpur, B. N. W.	400
*23. Samastipur Central Sugar Co., Ltd., Samastipur. (Managing Agents—Messrs. Begg Sutherland & Co., Ltd., Cawnpore.)	Darbhanga	Samastipur	Samastipur, B. N. W.	650
*24. Ryam Sugar Co., Ltd. Ryam. (Managing Agents—Messrs. Begg Sutherland & Co., Ltd., P. O. Box No. 21, Cawnpore.)	Do.	Ryam	Tarsarai, B. N. W.	650
25. Lohat Sugar Factory of the Darbhanga Sugar Co., Ltd. (Managing Agents—Messrs. Octavius Steel & Co., P. O. Box No. 55, Calcutta.)	Do.	Lohat	Sakri, B. N. W.	800
*26. Sakri Sugar Mills. (Managing Agents—Messrs. Octavius Steel & Co., P. O. Box No. 55, Calcutta.)	Do.	Sakri	Do.	700
27. Shri Lakshmi Narayan Sugar Works, Nirmali. (Proprietor—Gupta Bros. & Co., P. O. Nirmali.)	Bhagalpur	Manoharpatti	Nirmali, B. N. W.	50
28. Semapur Sugar Works, Semapur, P. O. Katihar. (Managing Agents—Messrs. Octavius Steel & Co., Ltd., 14, Old Court House Street, Calcutta.)	Purnea	Semapur	Semapur, B. N. W.	500
29. Ganga Deshi Sugar Factory, Buxar. (Proprietors—Messrs. B. N. Brothers & Sons, Dumraon.)	Shahabad	Buxar	Buxar, E. I. R.	100
30. Dumraon Raj Krishna Sugar Factory. (Proprietors—Maharaja Bahadur Sir Kesho Prasad Singh, Kt., C.B.E., Dumraon Raj, P. O. Dumraon.)	Do.	Bikramganj	Bikramganj, A. S. L. R.	250
31. Rohtas Sugar, Ltd. (Managing Agents—Messrs. Imam Jaydayal & Co., 10, Chapel Road, Dinapur, Patna.)	Do.	Dehri-on-Sono	Dehri-on-Sono	1,500
32. The South Behar Sugar Mills, Ltd. (Managing Agents—Messrs. Nirmal Kumar Jain & Co., Devasram, Arrah.)	Patna	Bihta	Bihta, E. I. R.	850
*33. Gaya Sugar Mills, Ltd., P. O. Guraru, Purani Godown, Gaya.	Gaya	Guraru	Guraru, E. I. R.	400
<b>Bengal.</b>				
*1. Sitabganj Sugar Mills, P. O. Sitabganj. (Proprietors—Messrs. Surajmal Nagarmal, 61, Harrison Road, Calcutta.)	Dinaipur	Sitabganj	Sitabganj, E. B. R.	400—550
*2. North Bengal Sugar Mills Co., Ltd., P. O. Gopalpur. (Proprietors—Messrs. Surajmal Nagarmal, 61, Harrison Road, Calcutta.)	Rajshahi	Gopalpur	Gopalpur, E. B. R.	500—650
<b>Burma.</b>				
1. The Sahmaw Sugar Factory of the Burma Sugar Co., Ltd., P. O. Sahmaw, Upper Burma. (Managing Agents—Messrs. Finlay Fleming & Co., Ltd., Merchant Street, Rangoon.)	Myitkyina	Sahmaw	Sahmaw, Burma Railways.	350

## LIST "A"—contd.

## List of Modern Sugar Factories and Refineries existing in India in the year 1933-34—contd.

Serial No. and Name and Address of Firm.	District.	Location.	Nearest Railway Station.	Capacity.
<b>1. Factories working with Cane—contd.</b>				Tons.
<b>Madras.</b>				
1. Aska Sugar Works and Distillery, Aska. (Proprietors—Messrs. Permanand Sahu, Loknath Sahu, Jeewan Sahu, Ramchandra Sahu and Gopinath Sahu.)	Ganjam	Berhampore	Barhampore, B. N. R.	100
2. The Sri Ram Krishna Co-operative Industrial and Credit Society, Tummapala, <i>via</i> Anakapalle.	Vizagapatam	Tummapala	Anakapalle, M. S. M.	50
3. The . . . . . (Proprietor . . . . . S. Narasimha Raju Garu, B.A., B.L., President of the Etikoppaka Co-operative Industrial & Credit Society Ltd., Etikoppaka.)	Do.	Etikoppaka	Narasipatam Rd., M. S. M.	50
4. Sri Ram Krishna Sugar Factory. (Managing Agents—Rao Bahadur C. V. S. Narasimha Raju Garu, Etikoppaka, Vizagapatam.)	East Godavari	Kirlampudi	Samalkota	100
*5. The Indian Sugars and Refineries, Ltd. (Managing Agents—Messrs. Ranga Nathan & Co., Ltd., 9, Armenian Street, Madras.)	Bellary	Hospet	Hospet, M. S. M.	400
*6. The East India Distilleries & Sugar Factories, Ltd., Nellikuppam. (Managing Agents—Messrs. Parry & Co., P. O. Box 12, Madras.)	South Arcot	Nellikuppam	Nellikuppam	700
*7. Coimbatore Sugar Mills, Ltd., Podanur, Coimbatore District.	Coimbatore	Podanur	Podanur, S. I. R.	50
<b>Bombay.</b>				
1. The Belapur Co., Ltd., P. O. Harigaon. (Managing Agents—Messrs. Brady & Co., Royal Insurance Buildings, Church Gate Street, Fort, Bombay.)	Ahmednagar	Harigaon	Belapur, G. I. P.	600
2. The Saswad Mali Sugar Factory, Ltd. (Managing Directors—H. B. Girmé, Esq., Kopergaon.)	Sholapur	Akluj	Pandharpur, B. L. R.	200—400
3. Marsland Price & Co., Ltd., Bombay. (Managing Agents—The Tata Construction Co., Ltd., Phoenix Building, Ballard Estate, Bombay.)	Poona	Kalamb	Baramati, B. L. R.	150
4. The Maharashtra Sugar Mills, Ltd., P. O. Belapur Road. (Managing Agents—Messrs. M. L. Dahanukar & Co., Ltd., Shrikrishna Nivas, Kalbideri Road, Bombay No. 2.)	Ahmadnagar	Belapur Road	Belapur, G. I. P.	200
5. The Ravalgaon Sugar Farm, Ltd., P. O. Ravalgaon, <i>via</i> Malegaon Camp. (Managing Agents—Messrs. Walchand & Co., Ltd., Phoenix Building, Ballard Estate, Fort, Bombay.)	Nasik.	Ravalgaon	Manmad, G. I. P.	175
<b>Indian States.</b>				
1. The Jagatjit Sugar Mills, Co., Ltd., Phagwara. (Managing Agents—Messrs. Narang Bros. & Co., Ltd., 5, Montgomery Road, Lahore.)	Jullundur	Phagwara	Phagwara, N. W. R.	600
2. Raza Sugar Co., Ltd., Roshan Bagh, Rampur State. (Managing Agents—Messrs. Govan Brothers, Ltd., Roshan Bagh, Rampur.)	Rampur	Roshan Bagh	Rampur, E. I. R.	800

## LIST "A"—contd.

## List of Modern Sugar Factories and Refineries existing in India in the year 1933-34—contd.

Serial No. and Name and Address of Firm.	District.	Location.	Nearest Railway Station.	Capacity.
				Tons.
<b>I.—Factories working with Cane—</b> contd.				
<b>Indian States—contd</b>				
3. Kolhapur Sugar Mills, Ltd. (Managing Agents—Messrs. Shirgaokar Bros., Kolhapur, Shahapuri.)	Kolhapur . .	Kolhapur . .	Kolhapur, M. S. M.	300
4. The Phalton Sugar Works, Ltd., Phalton. (Managing Director—Vaman Shridhar Apte, Esq., 315, Girgaon Back Road, Bombay 4.)	Satara . .	Pimpalwadi . .	Lonand, M. S. M.	450—550
5. Shree Bhagwat Singhjee Sugar Works, Ltd., Gondal. (Managing Director—M. N. Chinnoy Esq., Gondal.)	Rajkot . .	Gondal . .	Gondal, Gondal Railway.	60
6. The Mysore Sugar Co., Ltd., Bangalore . .	Mysore . .	Mandya . .	Mandya, Mysore Railway.	1,400
<b>II.—Factories working with Raw Sugar alone.</b>				
<b>Punjab.</b>				
1. Harkishan Sugar Mills, Amritsar . . . .	Amritsar . .	Amritsar . .	Amritsar, N. W. R.	..
2. Amritsar Sugar Mills Co., Ltd., Amritsar. (Managing Director—Sardar Amar Singh, Amritsar.)	Do. . .	Do. . .	Do. . .	700 Mds.
3. The Lakhshmi Sugar & Oil Mills, Ltd., Amritsar. (Managing Director—Babu Bansi Dhar Sahib, Chatiwind Gate, Amritsar.)	Do. . .	Chatiwind Gate . .	Do. . .	300 „
4. Shree Guru Arjan Dev Sugar Mills. (Managing Agent—Seth Sunder Singh, Butari.)	Do. . .	Butari . .	Butari, N. W. R.	500 „
<b>United Provinces.</b>				
1. Unao Sugar Mills, Unao. (Owners—Messrs. Shri Krishna Dass Jagan Nath Prasad, Unao Sugar Mills, Unao.)	Unao . .	Unao . .	Unao, B. N. W. & E. I. R.	..
2. Cawnpore Sugar Works, Ltd. (Managing Agents—Messrs. Begg Sutherland & Co., Ltd., P. O. Box, 21, Cawnpore.)	Cawnpore . .	Couperganj . .	Cawnpore Central, E. I. R.	..
3. Baijnath Balmakund Sugar Factory, Anwarganj. (Proprietors—Mr. Banke Behari Lal and Mr. Madan Behari Lal, Anwarganj, Cawnpore.)	Do. . .	Anwarganj . .	Anwarganj, B. N. W. and E., B. & C. I.	..
4. Union Indian Sugar Mills, Nawabganj. (Proprietors—Messrs. Kamalpat Motilal, Cawnpore.)	Do. . .	Rawatpur . .	Rawatpur, B., B. & C. I.	..
<b>Madras.</b>				
1. The Deccan Sugar and Abkari Co., Ltd., Samalkot. (Managing Agents—Messrs. Parry & Co., P. O. Box 12, Madras.)	East Godavari . .	Samalkot . .	Samalkot, M. S. M.	..
2. Al. Vr. St. Sugar Mills, Techanalur . . . .	Tinnevelly . .	Techanalur . .	Tinnevelly, S. I. R.	..
<b>Indian States.</b>				
1. The Travancore Sugar Limited, Thuckalay. (Managing Agents—Vinayak Kumar & Co., Thuckalay, South Travancore.)	Trivandrum . .	Thuckalay . .	Trivandrum, S. I. R.	..

## Provincial Distribution of Sugar Factories existing in 1933-34.

Provinces.	Cane Factories.	Gur Refineries.	TOTAL.
1. Punjab . . . . .	5	4	9
2. United Provinces . . . . .	64	4	68
3. Bihar and Orissa . . . . .	33	..	33
4. Bengal . . . . .	2	..	2
5. Burma . . . . .	1	..	1
6. Madras . . . . .	7	2	9
7. Bombay . . . . .	5	..	5
8. Indian States . . . . .	6	1	7
TOTAL . . . . .	123	11	134

NOTE.—The capacities noted in these lists are approximate, as additions to plant are made frequently.

## LIST "B".

## New Sugar Factories that were Constructed for working during 1934-35.

Serial No. and Name and Address of Firm.	District.	Location.	Nearest Railway Station.	Capacity.
<b>1. Factories working with Cane.</b>				Tons.
<b>(1) Punjab.</b>				
1. The Punjab National Sugar Mills, Lyallpur. (Managing Agent—Sh. Sharif Ahmad, Lyallpur.)	Lyallpur . .	Lyallpur . .	Lyallpur Jn., N. W. R.	70
2. The Arya Sugar Mills, Dinanagar. (Proprietors—Ganga Bishen Dev Raj, Dinanagar.)	Gurdaspur . .	Dinanagar . .	Dinanagar . .	100
<b>(2) United Provinces.</b>				
1. Seth Shiv Prasad Bansidas Sugar Mills, Bijnor. (Proprietors—Messrs. Shiv Prasad Banarsidas Agrawal, Bankers and Mill Owners, 85, Lake Road, Lahore.)	Bijnor . . .	Bijnor . . .	Bijnor, E. I. R.	400
2. The Muradnagar Sugar Works, P. O. Muradnagar. (Proprietor—Bal Kishendas, Raghvir Shalla, Bharatpur.)	Meerut . . .	Muradnagar . .	Muradnagar, N. W. R.	50—75
3. The Lakarmandi Sugar Mills Co., Ltd., Lakarmandi. (Director—The Lakarmandi Sugar Mills Co., Ltd., Nawabganj, District Gonda.)	Gonda . . .	Lakarmandi . .	Katra, B. N. W. R.	100—150
4. The Campierganj Sugar Mills, Ltd., Campierganj. (Managing Director—H. M. Nisarullah, B. A., M.L.C., Rais, Quazipore Khurd, Gorakhpur.)	Gorakhpur . .	Campierganj . .	Campierganj, B. N. W. R.	150
<b>(3) Bihar and Orissa.</b>				
*1. Dalsinghsarai Sugar Works, Ltd., Samastipur. (Managing Agents—Messrs. Behar Trading Corporation, Samastipur.)	Darbhanga . .	Ujiarpur . . .	Ujiarpur, B. N. W. R.	300
2. New India Sugar Mills, Ltd., Hasanpur Road, P. O. Sakarpura. (Managing Agents—Messrs. B. R. Loyalka & Co., 7, Lyons Range, Calcutta.)	Do. . . . .	Sasan . . . . .	Hasanpur Road, B. N. W. R.	300 May be extended to 800 tons.

## LIST "B"—contd.

## New Sugar Factories that were Constructed for working during 1934-35—contd.

Serial No. and Name and Address of Firm.	District.	Location.	Nearest Railway Station.	Capacity.
				Tons.
<b>I.—Factories working with Cane—</b> contd.				
(4) Bengal.				
*1. Shree Radha Krishna Sugar Mills, Ltd., Beldanga. (Managing Agents—Messrs. Jobaharia Bros., 138, Harrison Road, Calcutta.)	Murshidabad	Beldanga	Beldanga, E. B. R.	400
2. Serampore Sugar Works, Ltd., Serampore	Hooghly	Ballavpore	Serampore, E. I. R.	..
3. The East Bengal Sugar Mills, Ltd. (Managing Agents—Messrs. Ramnath Dass & Co., Ltd., Registered Office No. 30/31/32, North Brook Hill Road, Dacca.)	Dacca	Shome (Kaliganj)	Arikhola, A. B. Rly.	100—150
4. The Deshbandhu Sugar Mills, Ltd., Charsindur. (Managing Agents—Messrs. Industrial Agency, G. Patuatuly, Dacca.)	Do.	Charsindur	Gorshal Flag, A. B. Rly.	150—200
5. Shikarpur Sugar Mills, Raja P. D. Raikut Bahadur, M.L.C. (Proprietor—Baikunthapur Raj, Jalpaiguri.)	Jalpaiguri	Shikarpur	Belacoba	150
(5) Burma.				
1. Zeyawadi Sugar Factory. (Proprietor—R. B. Harihar Prasad Sinha, 11, Reddiar Avenue, Wiugaba Road, Rangoon.)	Taunggo	Zeyawadi	Zeyawadi, B. Rly.	600—800
*2. The Thaton Sugar Works, Ltd., P. O. Bilin, Lower Burma. (Managing Agents—Messrs. Robertson & Co., P. O. Box 383, 80, Strand Road, Rangoon.)	Thaton	Honipale	Honipale, B. Rly.	400
(6) Madras.				
1. Sreerama Sugar Mills, Bobbili. (Proprietors—Rajah of Bobbili and Shree Kunwar Rajah of Venkatagiri.)	Vizagapatam	Bobbili	Bobbili, N. W. R.	150
2. The Vuyyur Co-operative Industrial and Credit Society, Ltd., Vuyyur.	Kistna	Vuyyur	Bezawada, M. S. M. Rly.	800—1,200
(7) Bombay.				
*1. The Pioneer Sind Sugar Mills Co., Ltd. (Managing Agents—Messrs. Mohatta Mukhi & Co., Ltd., P. O. Box No. 26, Mohatta Buildings, McLeod Road, Karachi.)	Nawabshah	Pritamabad	Khardo Jodhpur, Bikaner Rly.	300
Indian States (Central India).				
1. The Jaora Sugar Mills, Jaora. (Proprietors—Kaluram Govindram, Jaora.)	..	Jaora	Jaora, B., B. & C. I. Rly.	250 to be extended to 400 tons.

\*These factories have also refining plants.

\*\*This worked for the part of the season 1933-34.

## LIST "B"—concl'd.

## New Sugar Factories that were Constructed for working during 1934-35—concl'd.

Serial No. and Name and Address of Firm.	District.	Location.	Nearest Railway Station.	Capacity.
<b>II.—Factories working with Raw Sugar alone.</b>				
<b>United Provinces.</b>				
1. Ganga Sugar Works, Balawali. (Managing Agents—Pandit Vishnu Dutt, Ganga Glass Works, Ltd., Balawali.)	Bijnor . . .	Balawali . . .	Balawali . . .	500 mds.
<b>Madras.</b>				
1. Lakshmi Sugar Mills . . . . .	Tinnevely . . .	Alvartirunagri . .	Alvartirunagri . .	3½—4 tons.

## Provincial Distribution of New Sugar Factories Constructed for working during 1934-35.

Provinces.	Cane Factories.	Gur Refineries.	TOTAL.
Punjab . . . . .	2	..	2
United Provinces . . . . .	4	1	5
Bihar and Orissa . . . . .	2	..	2
Bengal . . . . .	5	..	5
Burma . . . . .	2	..	2
Madras . . . . .	2	1	3
Bombay . . . . .	1	..	1
Indian States . . . . .	1	..	1
<b>TOTAL . . . . .</b>	<b>19</b>	<b>2</b>	<b>21</b>

NOTE.—The capacities noted in these lists are approximate as additions to plant are made frequently. °

# NOTE ON INDIAN TOBACCO.\*

PREPARED BY THE AGRICULTURAL EXPERT TO THE IMPERIAL COUNCIL OF AGRICULTURAL RESEARCH, INDIA.

## Introduction of Tobacco into India.

THE Portuguese are credited with having conveyed the tobacco plant and the knowledge of its properties to India about the year 1508.† It is stated that it was first brought to the Deccan where it seems to have been known for nearly a century before it was carried to the rest of India. By the year 1617 smoking had become so general in India that the Emperor Jehangir forbade its practice; but it also seems a fact that tobacco was an article of comparative unimportance in India a century ago. The consumption of tobacco is still prohibited to the Sikhs and is discountenanced by some other castes, but the vast majority of the 350 million people in India use it for smoking, chewing or as snuff and the consumption of tobacco in India is now very large.

## Main Species Grown in India.

In continental India there are now two principal species of tobacco cultivated, viz., *Nicotiana tabacum* and *Nicotiana rustica*. *N. tabacum* is the more common. It is grown all over the country and is the chief species cultivated in the peninsula. The plant is pink-flowered with large sessile leaves and forms the most important sources of tobacco of commerce.

*N. rustica* is widely cultivated in eastern Bengal, Assam, the United Provinces, Punjab, and in Kashmir. This species differs most noticeably from *N. tabacum* by being a smaller, hardier plant with yellowish flowers, and stalked smaller leaves. It also gives a higher yield of leaf and requires a shorter time to come to maturity than *N. tabacum*. This latter characteristic makes it very suitable for the damper soils of inundated areas of Bengal; for the United Provinces where tobacco is generally grown as a late summer crop which must mature early in order to be ripe before the weather gets too cold; and also for the Punjab where it is planted out in the early spring and must finish its growth before the weather gets too hot. In Burma *N. tabacum* is chiefly grown.

## Important Tobacco-growing Tracts, Varieties grown, with remarks on Local Methods of Cultivation, Curing, Marketing, Uses, etc.

Although tobacco is grown in practically every district in British India, the important tracts are few in number and are situated in the provinces of

Bengal, Madras, Bihar and Orissa, Burma and Bombay (cf. statement A at page 19).

In Bengal, the main tobacco-growing areas are in the districts of Jalpaiguri and Rangpur, and in the State of Cooch Behar. About three-fourths of the crop is under *N. tabacum* which includes the varieties locally known as "Bhengi", "Naakhhol" and "Hingli". The remaining one-fourth is under *N. rustica* which includes the local "Bilaite" or "Motihari" variety.

The types of tobacco introduced by the Agricultural Department include the Sumatra wrapper, and the Burmese Havana, Manila and Pennsylvania filler tobaccos; the area under these rose to about 500 acres but due to economic depression and a limited foreign market this has now decreased considerably.

Tobacco seeds are sown from August to September; transplanting of seedlings is done from October to December and the crop is harvested in March-April. Whole plants are generally harvested but individual leaves only in some types when the dew has dried off in the morning. These are left in the sun for one to two hours and then carried to the drying shed which may or may not be a special erection. As a rule, the cattle-shed and outhouses serve this purpose. The plants are slung on bamboos tip downwards, a foot or so apart. The process of drying takes about 3 weeks. The leaves are then stripped from the main stalk and placed flat in heaps, stalk inwards, to ferment, the heaps being closely watched and turned periodically to prevent over-heating. Fermentation takes about two months, after which the heaps are opened and the leaf made into "bands" each containing 20 to 30 leaves of about the same size. The tobacco is either sold in this state or kept in heaps to mature. The yield is about 700 to 1,000 lbs. of dry leaf per acre.

In 1907 the local Agricultural Department opened a farm in the Rangpur tobacco tract, the lines of work being the improvement of local tobaccos by selection; and investigation into the possibilities of introducing suitable varieties of exotic cigar tobacco, Virginia tobacco and Turkish tobacco and the improvement of the methods of cultivation.

As a result, selected races of "Bhengi" and "Motihari" are now grown throughout the tobacco tract and in other parts of the province these new areas represent 25 per cent of the present acreage of tobacco in Bengal. Among cigar tobaccos the cultivation of Sumatra wrapper leaf has been successful, the quality being high. Filler tobaccos were not so successful. Owing to the light soil, they

\* The last note on this subject appeared as a supplement to the *Indian Trade Journal* of September 24, 1931.  
† Sir George Watt's Commercial Products of India.

lacked body and aroma, although the burning qualities were good, but Burmese Havana, Pennsylvania and Manila are now being grown on heavier soils with more success.

As regards Virginia types, the White Burley variety has been the most successful. Excellent quality flue cured samples have been secured but it is still doubtful whether these can be produced profitably. The Turkish tobaccos tried did not maintain their flavour in Bengal.

Ohio—a pipe tobacco—has been cured by a special process termed fire curing with mango and tamarind wood as fuel and its flavour and quality has been well spoken of in the London market.

With regard to cultivation, the practice of green manuring had been introduced on an extensive scale, and the use of fertilisers is extending.

The finer qualities of "Bhengi" are shipped to Burma where most of it is used for making the Burmese "torch" (the large cigar smoked locally) but some is used for the ordinary Burma cheroot. The poorer qualities of "Bhengi" are purchased by cigarette manufacturers. "Naokhol" finds a market in the Maldives, while "Hingli," which is grown in Central Bengal, is chiefly consumed as snuff. "Motihari" is mainly used for 'hooka'\* tobacco but a certain quantity is also used for making snuff.

Burma is the main consumer of Bengal tobacco and is paying Rs. 15 to Rs. 20 a maund for it while the local rate for country tobacco is about Rs. 10. For cigar tobaccos introduced by the Agricultural Department the best grades fetch as much as Rs. 40 per maund.

In Madras, the most important tobacco-growing centre is Guntur district where about 120,000 acres are annually under this crop. The centres next in importance are in the Vizagapatam, Coimbatore, East Godavari and Madura districts in the above order. *N. tabacum* is the main variety grown.

In the Guntur district the crop is grown dry (unirrigated) and the leaf is in consequence lighter. It can be used for the manufacture of cigarettes, and most of the leaf is exported to foreign countries for that purpose. 'Adcock' and 'White Burley' varieties were grown formerly, but now the main Virginian variety is 'Harrison's special', of which there are about 40,000 acres in the Guntur district. Besides, the country brown tobacco of Guntur is used for cheap cigarettes in Japan, and Europe, and for pipe tobacco in England. Cigar tobacco is

also grown in a few places and fetches a premium. In the adjoining Kistna district the crop is grown on a commercial scale in the Lankas (deltaic islands) and in the black soil areas. Firms interested in the purchase of leaf for cigar and cigarette manufacture make their own arrangements with the cultivators for growing the variety of tobacco which they require. There is a considerable export trade in cigars from Dindigul in the Madura district to Ceylon and foreign countries. In the Vizagapatam district a large portion of the tobacco grown is consumed locally and in addition a considerable amount of cheroot leaf enters from the Godavari and Kistna districts.

In the Godavari district production also exceeds the local requirements, the excess being sometimes exported to Bengal and Burma. Tobacco grown in the Lankas (deltaic islands) of the Godavari river has the reputation of being the best. In the district of South Arcot, which only grows about 1,700 acres, the tobacco produced at Sivapuri is famous for its aroma and is in great demand for chewing purposes all over the Presidency. In the Coimbatore district, the type called "Meenampalayam" has established a good name as a chewing tobacco.

There are some cigar factories at Trichinopoly, the raw material being obtained from the town of Dindigul in the district of Madura and from parts of the Salem district. Tobacco from the former district is a little brighter in colour and is largely used as filler for high class cigars, while that from the latter district is dark in colour and is used for cheroot making. Cigar tobacco grown in Dindigul has fairly good burning qualities and the leaves are used as fillers and binders. For wrappers the manufacturers in Trichinopoly obtain leaves from Java and Sumatra. In short, except for the tobacco grown on the black soils in the neighbourhood of Guntur which is largely used for the manufacture of cigarettes, and the tobacco grown in the Dindigul part of Madura district which is used for making a Trichinopoly type of cheroots, the bulk of the tobacco grown in the Madras Presidency is fit only for the manufacture of local cheroots, snuffs, *bidis*\* and for chewing.

Sowing and transplanting of tobacco in the Presidency take place at widely differing dates extending from July to February, depending on the districts in which cultivation is carried out. The dates of harvesting are consequently equally various. In the Guntur district sowing and transplanting take place from October to December and harvesting from February to March. In Vizagapatam and East Godavari sowing takes place in August,

\* The *hooka* is the indigenous pipe in which the smoke is drawn from the bowl, through water, to the mouth of the smoker.

\* A sort of indigenous cigarette the cover of which is formed of the *tunki* leaf (leaf of *Diospyros melanoxylon*).



trans-planting in September-October and harvesting in January-February; while in Coimbatore sowings and transplantings are done between July and October and harvesting between October and February, respectively. The plants ripen in ninety to hundred days after transplanting. When ripe they are cut off close to the ground and are allowed to remain exposed to the night dew. In the morning they are gathered up and bulked into small circular heaps two feet high, the stalks outwards, covered with straw and not opened till the third evening after the harvest. The plants are then spread on the ground for a short time, after which they are hung on horizontal poles with the stalks pressed close to each other. The leaves are cured in 15 to 20 days from the time of hanging up, the colour being then a rusty red, yellow and green, except where the leaves have been too closely pressed together, when the colour is black.

When the mid-ribs of the leaves have become sufficiently dry, the plants are taken down and bulked in square heaps, the stalks being laid cross-wise over each other in alternate rows, the heaps being two feet or more in height. The leaves are not stripped from the stalks but bulked just as they are taken from the poles. This operation is done in the morning when the leaves are sufficiently supple to handle. These bulks are opened and rebulked every two or three days. When a black colour is produced the fermentation is finished and the leaves are stripped off the stalks and tied up into bundles of 50 leaves weighing  $1\frac{1}{2}$  to 2 lbs. per bundle, and baled.

The flue curing of tobacco has become a common feature in the Guntur district in the course of the last ten years and there are about 1,600 barns constructed for the purpose in different parts of the district. These barns are constructions of brick with a roof on top and are provided with metal flues and a hearth arrangement for heating. Green leaves are charged in the barn and subjected to varying degrees of temperature and ventilation, starting from 90° to 160° F. to cure the tobacco to proper colour and condition. The operation takes about six days to complete, and is being used for the large bulk of Virginian tobacco.

The normal yield in the case of a dry (unirrigated) crop varies from 600 to 1,000 lbs. of dry leaf per acre and up to 1,500 lbs. in the case of an irrigated crop. The net profit per acre to the cultivator is estimated to be between Rs. 50 to 150 per acre.

The manufacture of *bidis* is prevalent in nearly all districts and is carried out chiefly by Muhammadans—*purdah* women taking a large part in the work where it is carried on as a cottage industry. The tobacco dust is imported from Bombay Presi-

dency and Mysore either direct or through Madras City. Three varieties of tobacco at prices ranging from Rs. 4 to Rs. 13 per maund according to quality are mixed together, and finely cut to form the *bidis* filling and the *tumki* leaves (*Diospyros melanoxylon*) used as the wrapper are obtained from His Exalted Highness the Nizam of Hyderabad's Dominions at about Rs. 35 per thousand bundle (cooly head load). The industry is carried on throughout the year. It involves no capital outlay; nor does it demand any skill. It is carried on on a comprehensive scale in Madras City, North Arcot, Salem, Coimbatore and Tinnevely districts but suffers for want of sufficient supply of *bidis* leaves which are imported from distant places. *Bidi* manufacture is also an important cottage industry in Malabar and South Kanara districts, and in many other places in the presidency. Here again the *bidis* wrapper leaves and the tobacco used are mostly brought in from distant places, much of the leaves coming from Cuddapah, Kurnool, Hyderabad (Deccan) and Nagpur and much of the tobacco from the Bombay presidency and from Mysore. Local tobacco is not used freely for this purpose, but scraps of Guntur Virginia are also utilised. The manufacture of *bidis* and the advent of cheap cigarettes have given a setback to the cheroot industry; and the demand for the higher priced brands of mild smoking cigars is on the decrease.

As regards marketing of the tobacco grown in the Madras Presidency, the crop in general is disposed of either to local merchants or to wholesale merchants in the nearest town. The more striking features in the marketing of Madras tobacco are the increasing area under Virginian tobacco which meets the demand in England as also of several cigarette factories in Calcutta, Secunderabad, and Bangalore, etc.; outside the Presidency, the demand for country brown tobacco in Japan and the continent and the extensive demand for 'dust tobacco' of Guntur for the *bidis* and *hooka* trade in North India, and the export to the Straits Settlements and the Federated Malay States of cheroot and chewing tobacco. The price paid for Virginia ranges from 1 to 9 as. per pound to the grower, and it sells from 4d. to 1s. 2d. at the London market. The demand for cigarettes is increasing and most of these are supplied by Indian manufacturers at present. The largest purchases of cigarette tobacco are made in Guntur by a combination of wholesalers who buy from *ryots* and ship tobacco to England and Japan after processing. Tobacco is sold to foreign countries usually in grades, but they have not yet been standardised. The export trade of Madras and India, is mainly due to the development of cigarette type at Guntur. No systematic attempt has so far been made to improve the indigenous varieties by selection, but recently

a tobacco research station has been opened at Guntur.

In Bihar, there are two main blocks of tobacco grown, the most important one being that included in the Muzaffarpur and Darbhanga districts where the crop covers a compact block of about 63,800 acres. The area of second importance is in the Purnea district where it is about 56,900 acres. This latter is closely connected with the tobacco area in north-west Bengal, which as already noted has its centre in Rangpur.

The cultivation of tobacco in the Tirhut Division is confined mainly to the districts of Muzaffarpur and Darbhanga where it is grown on rich sandy loam soil that always remains above flood level. The variety grown is *N. tabacum*, and it is mainly used for *hookah* smoking, though a good deal is now being used for cigarettes and as fillings for *bidis*.

At one time, the crop was grown on lands which had received heavy dressings of *Sith* (refuse from the indigo factories), but now the fields are given farm-yard manure and ashes at the rate of 300 maunds per acre before the crop is transplanted, while cattle are also regularly folded on the plots to be put down to the crop. In addition to this there is an increasing tendency for better-class cultivators to apply a top dressing of *Nicifos-II* at the rate of one or two maunds per acre. During the monsoon, the land is kept fallow, and is ploughed weekly if weather and soil conditions permit.

The raising of seedlings begins about August or September and when the plants are three to four inches high they are transplanted in the fields, which have been thoroughly well manured and cultivated during the monsoon. The seedlings are planted out in October-November at three feet intervals in both directions, and are watered daily until they take root. Subsequent cultivation consists in maintaining a good deep mulch on the field with the idea of keeping down weeds and of providing the aeration so necessary in tobacco cultivation. As a general rule the crop is not irrigated in these parts.

Harvesting of the crop begins in March, each plant being cut as a whole when it is mature. For some days after cutting, the plants are spread out in the field and then the leaves are removed from the stems. These leaves are then tied in small bundles and are cured by alternate drying and fermenting, fermentation being obtained merely by stacking the leaves in heaps. Fifteen maunds per acre is a good yield, but eight to twelve maunds is the general average.

When the price went up to Rs. 25 per maund after the war, a great impetus was given to tobacco cultivation and all castes became interested in the crop, but with a decrease in the market price, the area under the crop is steadily shrinking, and is now placed at about 63,800 acres. Apart from

supplying the internal market, there is an exportable surplus which now-a-days is bought mainly by Calcutta dealers though a certain amount is also purchased by Bombay merchants.

There are factories at Dalsingarai and Monghyr which buy large quantities of the best of the local tobacco for cigarette making.

The Purnea block may be considered as an outlying part of Rangpur and the information given under Bengal applies to it. The produce is bought up by Bengalis.

The Imperial Agricultural Research Institute, which, till lately, had been located at Pusa in North Bihar had carried out all the research work on tobacco which has been done in the province. There are flue-curing barns at Pusa where instructions on flue-curing of tobacco are given. Recently a pair of flue-curing barns have been set up at the Agricultural Research Institute at Sahpur near Bhagalpur.

In Burma, the main tobacco-growing areas are along the big rivers, on land which is submerged and enriched by flood water for weeks at a time during the rains and is finally exposed by the fall of one river level at the close of the monsoon in October-November. Tobacco cultivation on land not subject to submergence has been started in recent years in one or two districts, but the area at present is negligible.

Burma grows three main types of tobacco:—

- (a) The so called "Burmese" tobacco,
- (b) Havana tobacco,
- (c) Lunka tobacco.

Of Burmese tobacco, there are two varieties: (1) Hse-ywet-gyi, the large leaved variety, and (2) Hse-ywet-chun, the leaves of which are smaller and more pointed. The former of these yields a heavier crop, but the latter gives leaf of better quality.

The tobacco demand in Burma itself is chiefly for cheroot making. The cheroots made are of two types, the strong cheroot or 'Hse-byin-leik' and the mild cheroot or 'Hse-baw-leik'. Lunka and Havana types are used for the manufacture of the strong cheroot which is made entirely of tobacco, and is smoked by Europeans and by certain of the Lower Burma town dwellers. In the manufacture of the mild cheroot, which is the general smoke of the Burmese people, a mixture of chopped tobacco stalk and shredded Burmese tobacco leaf is used as filler with wrapper of either the sheath of the maize cob or the prepared leaf of the *tha-nat-bin* (*Cordia* spp.). Other uses of Burmese tobacco, especially the lower grades, are for making *bidi*, *hooka* tobacco, snuff and *an-wun* (block tobacco smoked by the Chinese). Much of the tobacco exported is inferior grade of the so-called Burmese tobacco.

At present there are no cigarette factories working in Burma, and tobacco is not generally used as snuff by the Burmese people.

Preparation for growing the crop begins with seeding of nurseries on the high well drained land above the river in the months of September and October; transplanting into the fields by the river side takes place in December-January, and by mid-April, the crop is ready for harvesting. The leaves are gathered singly, usually early in the morning, and carried in baskets to the homesteads. Generally no preliminary "wilting" is given, and curing starts on arrival at the steading.

There are three systems of curing, each of which produces a different type of tobacco. These are:—

- (a) Da-li-hse, which is chopped or shredded tobacco used mainly for pipe smoking.
- (b) Kat-hse, which is used for making *bidi*, *hooka* tobacco, snuff, *an-wun* and the mild cheroot.
- (c) E-hse, which is used for making the strong cheroot.

In the making of Da-li-hse, for which in general only the inferior leaves are used, the tobacco is shredded with a knife as it is brought in from the field and dried in the sun for two or three days in heaps, moistened from time to time, and then packed tightly in wicker baskets each holding about 1½ bushels, over which a cloth is tied. The tobacco is hot-smoking and possesses little flavour.

In making Kat-hse, the value of the tobacco depends largely upon the thickness of the leaves. More drastic suckering has therefore to be carried out than in the case of the tobacco intended for E-hse or shade curing. Leaves are harvested in the morning, and to facilitate drying the mid-ribs are smashed one by one with a blow from a wooden mallet or harrow-tooth. This occupies the day of plucking. The following morning, the prepared leaves are spread on the ground in the sun, one half of each leaf over-lapping the other, but exposing the mid-rib of each leaf to the heat of the sun. To prevent them from blowing away or turning, the leaves are covered lightly with stems of "Kyu" or kaing grass which are held in place by an odd rod or two of bamboo. In some areas latticed squares of split bamboo or 'kata' are used instead of the kaing grass for holding the leaves in place, and it is from this that the process takes its name, though the use of these frameworks or 'kats' is not general. The leaves are thus dried in the sun the whole day and are collected only in the evening when the air is cool and the leaves are fairly pliable. Any leaf of which the mid-rib is not thoroughly dried is put aside for redrying the next day. The dried leaves are then heaped under a covering of

gunnies or in a plaited bamboo receptacle, care being taken to make it as air tight as possible. Here they remain for several days or even weeks, after which they are either sold direct or tied into hands and built into fermentation heaps. In making Kat-hse, re-building of the fermentation heap is done only at long intervals as the leaves have already been fairly dried out. This method is generally adopted for curing "Burmese" tobacco.

In making E-hse about 30 green leaves (about 1 lb. weight) are threaded through the bottom of their mid-ribs on to a thin strip of bamboo or fibre about 12 to 18 inches long, the ends of which are then closed by knots or by loops. The threaded bundles of leaves are then hung up on bamboo poles in a hut made of matting.

These bamboo poles stretch horizontally across the hut in tiers at heights of 5, 7, 9 and 11 feet from the ground. The interval between bamboo on the same tier is about 9 inches at the commencement of the curing, being lessened to half that interval as curing progresses. Bundles of leaves are straddled on these poles about 4 or 5 inches apart, a 15-foot pole holding 40 bundles or so and giving 10 to 12 lbs. of cured tobacco. Drying is unregulated, and goes on to the break of rains in June, the leaf turning gradually from green to a golden nut-brown if conditions have proved favourable.

By the time the rains have been started 3 or 4 days the humidity of the air has caused the bundles in the drying shed to become limp. They are then taken down and built into heaps in the same way as the larger bundles of Kat-hse. The re-building of the heap, however, which begins after about 7 days, takes place more frequently than in the case of Kat-hse, the sequence of intervals normally being 8, 12, 20 and 30 days, etc. E-hse is reckoned to be at its best after it has been kept for 5 or 6 months. Only the thin-leaved Havana and Munka varieties are used for E-hse.

In Burma the outturn per acre of cured leaves varies from 400 to 1,000 lbs.

• In the composition of the hse-baw-leik, the "whacking white cheroot" which is so esteemed by the Burmese villager, tobacco-leaf plays very little part. As regards the strong Burmese cheroot of commerce, which is made entirely of tobacco, three grades of leaf are recognized, the wrapper (ta-bet or ah-shay), the binder (Tat-ta-bet or ah-toh), and the filler (ah-sa).

Of these the wrapper and the filler serve vastly different purposes, the wrapper leaf being selected on account of its appearance and the filler on account of the flavour it imparts. In theory at any rate, they should be represented by entirely different varieties of tobacco. In actual practice in Burma one variety of tobacco is generally made to serve all three purposes, with possibly a small admixture

of other tobacco to the filler to give individual flavour.

Cheroot rolling in Burma is essentially a local industry, women who are rollers of some degree of skill being found in almost all towns, and in most tobacco villages. It is not a standardised occupation for which factory costings are usually kept, nor one about which information is given at all freely to an enquiry. Any figures here quoted must be read with this in mind.

Although in the rolling of Burmese cheroots, no factory system obtains, a single worker alone is seldom employed, the usual practice being for a skilled worker to be assisted by one moderately skilled and by an apprentice. The apprentice seldom does any rolling, her work being the preliminary occupations of casting, stripping, shaping the wrappers, and drying, winnowing and sieving the filler. In this she may from time to time be assisted by the roller of medium skill. The most skilled worker devotes her time to rolling only. The output of a combination of three persons thus collaborating is, therefore, represented by the rolling of two and on a daily average would work out at 600 large-size cheroots, 800 of medium size, or 1,000 small, giving respectively  $16\frac{1}{2}$  days,  $16\frac{1}{4}$  days and 17 days to finish up 100 viss of tobacco as originally issued. This output reconverted into single-worker terms, represents approximately 50 worker days per 100 viss of tobacco handled.

In the chart below which shows the disposal of 100 viss of good average tobacco used for cheroot rolling the loss incurred in turning the unmanufactured tobacco into cheroots is shown as 40 per cent. Of this a quarter (i.e. that part which takes the form of wrapper and binder waste, ends and cuttings) could be used up subsequently as filler for cheroots of low grade. The net waste may therefore be taken as about 30 per cent.

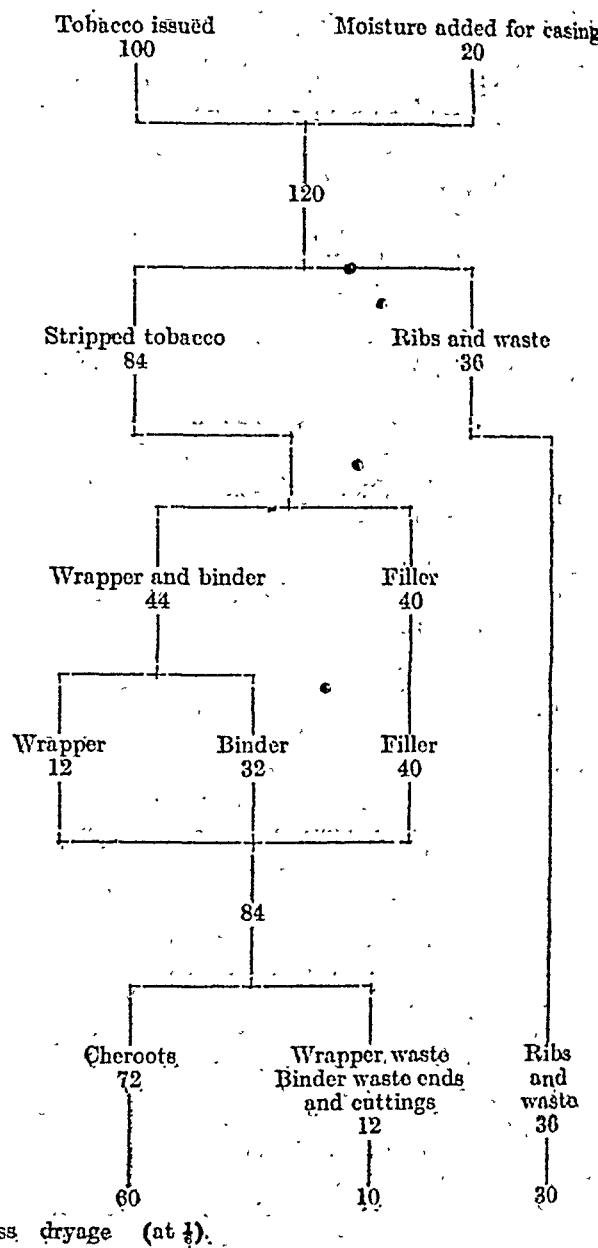
Rolling is usually done on contract, the general rate being 4 annas per hundred for the large size cheroot, 3 annas per hundred for the medium, and 2 annas 6 pies for the small.

In the course of the rolling it has become customary in some districts to spray the filler tobacco overnight with "flavourings". These are made up from very secret recipes.

Various concoctions of vanilla, brandy, gin and port-wine, tan-ye and sugar-water; etc., are used. Also saltpetre is sometimes used to improve the "burn" but its use often masks slovenly rolling. Variations in flavour can be provided by a judicious mixing of different tobaccos in the "filler" used; and in many parts of lower Burma this practice has already been taken up, "Corinjee" and "Lunka" tobacco being highly esteemed for the purpose.

It is to this demand for fillers of particular flavour that much of the large import of unmanufactured tobacco into the province is due.

Chart showing disposal of 100 viss good average Tobacco when used for Cheroot Rolling.



Less dryage (at  $\frac{1}{4}$ ).

During the six-year period 1928-29 and 1933-34 Burma's export of unmanufactured tobacco averaged Rs. 13.28 lakhs per year. The chief buyers of it were Bengal and the Straits Settlements, whose combined annual buyings averaged Rs. 10.06 lakhs. The value of the import into Burma of raw tobacco is, however, approximately two and a half times the export. Bengal and Madras are the main suppliers. The bulk of the export is inferior grade "Burmese" tobacco; the import is mainly of medium grade full flavoured kinds for which a regular demand exists in Burma for use as filler for the Burmese "mild" cheroots and, to a smaller extent, for chewing.

In the trade in manufactured tobacco, the excess of imports over exports is considerable. The annual

import over the six year period 1928-29 to 1933-34 has averaged Rs. 85.73 lakhs; whilst the export has been only 3.94 lakhs. Cigarettes account for over 95 per cent of the import trade and at present India supplies practically the whole of the import under this head. In the not very considerable exports of manufactured tobacco from Burma, cheroots and cigarettes are the main items. Bengal, the United Kingdom and the Straits Settlements are the chief buyers of cheroots, whilst the cigarettes (which go practically all to Bengal) are said to be re-exports of Indian manufacture in re-adjustment of stocks by the importing firms.

The Agricultural Department has a small farm of ten acres, run as an annex to the central farm at Allanmyo, which deals with tobacco problems and where exotic varieties are being tested. Methods of curing are being worked out there with a view to improving the Burma cheroot and also to get a type of tobacco suitable for cigarette making.

In the Bombay Presidency, there are two main tobacco growing regions:—

- (a) the area in the Western Deccan and Southern Maratha country, centring round Kohlapur but extending into the Belgaum district on the south and to a less extent into the Satara district on the north.
- (b) the area in the Northern Gujarat, where the cultivation centres round the Charotar tract, and is chiefly in the Kaira district and the adjoining portions of Baroda, Cambay and other Indian States.

The crop is grown almost entirely for Indian consumption.

Seeds are sown early in July, seedlings are transplanted in the latter part of August and the crop is harvested between the end of January and end of March according to the district in which it is grown, and whether it has been grown on irrigated or unirrigated land.

In the Western Deccan and the Southern Maratha tract the main variety grown is *Kare Baglani* (*N. tabacum*) although *Shandi—Surti* (*N. tabacum*) and others are grown to some extent. Most of the leaf is made into "*Jarda*" (leaf broken up into granules) and used for filling *bidis* or as tobacco for chewing. "*Jarda*" prepared here goes to all parts of India where *bidis* are made.

Harvesting is done as usual when the leaves become slightly hard, and are yellowish in colour with brownish spots. The whole plant is harvested by being cut at the base with a sharp sickle. It is carried carefully to a convenient place in the field and spread in "*chaps*" (layers).

To form these "*chaps*," the plants in the lower layer are laid in a double row on the ground, the heads of each pair of plants being towards each other; in the next layer above that the stalk ends are placed towards each other; and further layers

are built on top, one row with the heads of the plants together in the middle of the row and the next with stems together in the middle alternately. The length, breadth and depth of the "*chap*" depends on the quantity of the produce in the field. If the weather is clear, the plants are left in the "*chap*" without disturbance from 7 to 9 days, and then either carted home for the preparation of "*Jarda*," or taken for curing to pits dug in the field.

In the preparation of *Jarda* to be used for filling *bidis* the leaves are removed from the stem and dried in the sun for two or three days, being turned over three or four times during that period. When the leaf has become just sufficiently dried, the mid-ribs and large veins are separated, and the leaf blade is crushed into pieces small enough to pass through sieves used in the process. The mid-ribs and large veins are beaten into small pieces, then ground in a mortar or cut by a machine. Finally, they are passed through the sieves used for the granulated leaf, and added to the heap of *Jarda*. Bigger pieces which are difficult to reduce to the proper size are sold separately. In making *Jarda* the aim is to get the right amount of moisture in the material and break it up into a fine even-granular mass allowing as little dust as possible to be formed. Aroma, uniformity of colour and regularity in burning are also important properties; a thick leaf is considered to possess these qualities and is, therefore, preferred.

*Jarda* is prepared on a large scale in the town of Nipani. In Nipani, when a stock of *jarda* has been prepared, it is sprinkled with water and piled in heaps in warehouses. Fermentation takes place, and the colour is improved. Sometimes the heaps are sprinkled with a decoction of tobacco dust. This improves the colour very markedly and makes it more uniform.

*Jarda* for chewing purposes is prepared in much the same way as *jarda* for *bidi* fillings, but the granules are smaller and more uniform. Mid-ribs and large veins of leaves are usually omitted in making it. Usually also after sieving, it is stored throughout a monsoon season, after which it is sprinkled with water mixed with tobacco dust till all is thoroughly wetted, filled into small baskets, well pressed down and allowed to stand for 12 to 18 hours. It is then taken out of the basket, spread in a thin layer and allowed to dry in the shade. This operation of sprinkling, pressing in baskets and drying in the shade is repeated a second, and even a third time if the tobacco is inferior. The treatment gives it a dark brownish colour.

After being finally dried, it is mixed with various spices to give it a flavour to suit the market taste, powdered cardamom, nut meg, musk, saffron, being some of the substances used for this purpose. In some cases, rose-leaves are placed between layers

of *jarda* for about a week, after which they are removed and the tobacco is packed for the market.

Two-thirds of the tobacco grown in the Belgaum and adjoining areas is converted into *jarda* of one form or another; the remainder is cured in the form of whole leaves. The curing of whole leaves is generally done in pits in the field. For this purpose the tobacco is treated as for '*jarda*' until it is taken out of the "*chap*." It is then placed in a pit in a convenient place in the field, the floor and sides of the pit being first covered with a layer of millet straw. When filled with tobacco leaves, the pit is covered with a blanket or a gunny bag over which are heaped bundles of millet straw, and finally clods of earth, so that the whole mass is under pressure. After 36 hours the pit is opened and the plants are taken home. On the following morning the leaves are separated, each with a small piece of stem attached, so that the whole stem except about four inches at the base goes with the leaves. The leaves are then sorted into grades which are kept separate and under pressure for about 12 hours. They are then placed in bundles, each about 13 lbs. in weight. About 3 lbs. of fine large leaves being used on the outside of the bundles to cover inferior inner sorts. The bundles are then heaped above each other and kept pressed for 12 hours after which they are dried in the open yard in blocks. In building these blocks, a layer of millet straw is first laid down, then a layer of bundles, then a layer of millet straw and a layer of bundles alternately till 8 to 12 layers of tobacco are arranged on top of each other, the layers of millet straw acting as ventilators through which air can circulate slowly, thus enabling fermentation and drying to take place at a uniform rate. When dried the bundles weigh about 9 lbs. each, i.e., they lost about 4 lbs. in weight during the process above described. From Nipani the bundles of cured leaves go chiefly to Goa and Vengurla, about 30 bundles being tied in one package and covered with mats made of *toddy* palm leaves (*Phœnix sylvestris*) for despatch to market.

The town of Nipani, which lies in Belgaum, is the biggest tobacco market in the Bombay Presidency, about 37 millions lbs. of tobacco being sold there per annum. About 2,500 people are employed in that town alone for about 4 months in the *jarda* making season. The *jarda* for *bidis* chiefly goes to Calcutta, Madras, the Central Provinces and the Coast markets. It is usually despatched in gunny covers containing about 252 lbs. each. *Bidi* making is an important industry in Nipani and is also practised in the villages around. The tobacco grown in this tract is supposed to be of higher quality than others in India and fetches a better price in the Indian market.

In the tobacco-growing tract under reference, the outturn of cured leaf per acre varies from 400 lbs. to 750 lbs.

In the Northern Gujarat tract the varieties of *N. tabacum* known as (1) *Gandiu*, (2) *Piliu*, (3) *Keliu* and several others are grown. Besides these the *Calcutti* variety (*N. rustica*) is also being cultivated recently though the cultivation of it is restricted to a few villages and is of not more than about 50 to 100 acres in all.

The variety *Gandiu* is an important one. It is grown both with and without irrigation although by far the greater area under it is grown under irrigation. It occupies about 19 to 20 per cent of the area under tobacco in the Charotar tract. This variety has large, broad, coarse, thick leaves and gives a strong tobacco. *Piliu* has a narrower and shorter leaf and gives a tobacco superior in colour. It has a better smoking quality also. The extent under *Piliu* comes to 22 per cent of the total area under tobacco. It is grown both irrigated and dry. *Keliu* is grown to about 28 to 30 per cent of the total area under tobacco. The leaves of this variety are the longest of all varieties though somewhat narrower, and the product is used for *bidis*. Another variety named *Kiliu* grown on a very small scale particularly on saltish (nitrate) water is used for snuff and the *hooka*. The variety *Saij-puriu* grown on small scale under irrigation gives a tobacco that is valued for chewing as well as for other purposes.

The quality of all the tobacco grown in the tract is too coarse and strong to have a market outside India, but it suits the taste of the Indian consumer for smoking in *bidis* or the *hooka*, for chewing and for making snuff. There is a large demand for it for these uses as purchasers want a leaf which is thick and strong. To a small extent it is exported as a cheap tobacco for the purpose of strength.

The marketing is not so well organised as it is in foreign countries. There is careful grading on the basis of colour, and smoking strength which is tried by actual smoking. Prices vary according to quality from Rs. 2-8-0 to Rs. 12-8-0 per maund of 40 lbs. Strong tobaccos of all shades of colour, yellow, brown or black, are in requisition in different tracts and for different purposes. Mildness is a positive demerit although harshness and fullness are differentiated.

In this tract, the plants are harvested either by staple cutting or dry individual leaf-cutting and are mostly dried by spreading on the ground round the stalk in the open. A small quantity harvested in individual leaf form is also dried under shade on racks to give green-coloured tobacco. Fermenting is carried on in stalks or heaps of varying lengths according to the quantity of tobacco on hand, the height and breadth of the heaps being about 4 feet.

As regards yield, the outturn per acre of cured leaf is about 1,200 lbs. on irrigated lands and about 800 lbs. on dry lands.



The cultivators of Gujarat used to regard tobacco as a paying crop, but recently labour and other charges have increased while the prices obtained have fallen off to about 50 per cent or less of their former value, and hence the crop is now considerably less paying.

Repeated attempts have been made to effect improvement in quality of the Gujarat tobacco to make it suitable for export purposes and for foreign tastes. As far back as 1865 choice Shiraz tobacco was imported and gave a product with an exceedingly fine flavour. Also from 1871 onwards experiments were undertaken by a local association chiefly in the direction of introducing foreign varieties of tobacco and improved methods of curing with the object of producing cigar tobacco in Gujarat. The Association established an experimental farm, which is still used for experimental work, although the direction of work is changed from cigar tobacco to local use tobacco and cigarette tobacco. Formerly curing sheds for curing cigar leaf were erected and foreign experts were employed for a series of years to cure cigar leaf. But the plans for producing cigar leaf were destined to fail on account of the Gujarat climate being too dry to produce cigar leaf of the proper quality. A factory manufacturing cigars and pipe mixtures was also opened and quite a considerable area of Virginia tobacco was grown. The types of tobacco growing during this period included Havana, Sumatra, various types of Madras and American varieties. Most of these types grow successfully, but despite the assistance of expert curers, the cured tobacco did not entirely meet with approval in the foreign markets. The venture was not a success and the partial failure was ascribed to bad curing. Up to 1922 in fact, the net result of all experimental work on the actual improvement of the tobacco crop was very small. The basis of the new work then undertaken was primarily the improvement, by breeding, of the local tobacco crop both in yield and quality, including also the trial of Virginian varieties of cigarette quality as the new fashion in smoking had drifted from cigars to cigarettes. The most important result got from the selection within the local types conducted since 1922 through the succeeding years has been the isolation of several improved strains, the two best being the highest yielding strains known as *Gandiu* No. 6 and *Piliu* No. 28, each of which is reported to be giving about 10 per cent higher yield than local crop of these varieties. The improved variety *Gandiu* 6 is estimated to be growing on about 20 to 25 per cent of *Gandiu* tobacco lands in Gujarat, whereas *Piliu* 28 has not made much headway in the tract on account of its larger leaf size and slightly inferior quality of smoke in comparison with the local *Piliu* variety. The type *Gandiu* No. 6 is also in considerable demand outside Gujarat on account of its

high yield and consequent better paying character in general. Further efforts are being made to improve its quality for local tastes and also for use in cigarettes by crossing it with the Virginian type, Adcock, and some promising hybrids secured.

Other efforts in the direction of production of cigarette tobacco consist in (a) variety trials for comparative yield and quality of the Virginian varieties Adcock and Harrison Special and the Puss hybrid No. 142, (b) study of cultivation methods to produce leaf of required thinness and (c) study of the method of flue-curing suitable to Gujarat conditions of climate. A flue-curing barn for the lastnamed purpose is constructed at the Government Tobacco Research Station, Nadiad, and quality studies of the flue-cured tobacco together with the comparative economic studies for producing local use tobacco by the common country method and cigarette tobacco by the flue-curing method are under way. The finding in respect of the quality of the cigarette tobacco has been that certain British Firms have opined that the flue-cured tobacco of the variety Harrison Special produced at Nadiad is on a par with the same variety produced in the Guntur tract of the Madras Presidency.

In Baroda State, efforts have been made to cure varieties of American tobacco such as Adcock and other varieties of like type, using the flue-curing barn. Results have been however somewhat vitiated by frost in two of the four years of trial. Attempts to safeguard against damage from frost by early planting have not been effective, as the quality of the leaf secured on early planting has been poor. These varieties appear particularly susceptible to leaf curl on these soils.

The area under tobacco in the Punjab does not compare favourably with the area under this crop in the other provinces. The area under tobacco in the Punjab is only about 5.5 per cent of the total area under this crop in India. Although the crop is not very important from the all-India point of view, yet it is grown in all the districts of the province excepting Simla and Rawalpindi. The area under this crop in the latter district is barely 50 acres.

Out of the total area under this crop in the province, about 98 per cent is grown under irrigation with the result that the crop is of considerable importance in districts where irrigation facilities are adequate. The economic value of the crop to the province is over rupees sixty-six lakhs per annum.

*Nicotiana tabacum* and *N. rustica* are both cultivated, the former extensively; the latter is found mostly in the Ohhach tract of the Attock district and the Sialkot district. In the Campbellpur district it is mostly grown for snuff making, a local industry which is of very considerable importance to the district and exports its snuff practically to all parts of India. It is also grown for smoking in

the *hooka* and is considered to be more pungent than *N. tabacum*. *N. tabacum* is used mostly for smoking in the *hooka*. A small amount of this tobacco is used for mixing in cheap cigarettes.

Both *N. tabacum* and *N. rustica* have a large number of local names. In some cases types having the same name differ in different localities.

Among the tobacco types *Noki* and *Kakar* are two important names. The former has leaves which have a very much elongated tip and they usually bend downwards towards the soil and the length is much greater than the width. The *Kakar* type of tobacco is characterised by very dwarf stature, very small internodes and broad leaves which are thick with crinkled surfaces. It is said to have a very strong flavour in smoking and on this account it commands a higher price in the market than other varieties. *Ghora* is another type of tobacco which grows to a great height. The internodes of the plant are elongated and the leaves are very broad. This type of tobacco is said to be very high yielding, but the quality of its leaves is considered to be rather poor. The *Gidri* type is grown very commonly especially in the Gujrat and Jhang districts. The plants are sized with very broad leaves. Its yield and quality are both considered excellent.

The simplest method of curing practised in certain tracts of the Punjab is that the tobacco is cut when ripe and dried completely in the sun. The Multan circle is the main centre where this is practised. This method of curing is very crude and the stuff produced is of very low quality. The chief method of curing adopted in the prominent tobacco growing tracts, e.g., Jullundur, Gujrat, Jhang, etc., is what is locally called by the name of "laying a chakka". The details of this method are as follows:—

Before harvesting the crop, the field is irrigated and when the land is at the proper stage of dryness the plants are cut and allowed to lie in the field for 2 or 3 days for partially drying up. During this stage the leaves develop a yellow colour, which is very much esteemed in tobacco. During these days the plants are turned upside down every morning so that the leaves dry up uniformly. After this the plants are collected, tied up into small bundles and then buried in a pit dug in the ground, the walls of which are lined with some straw, so that earth is not mixed with the plants. At some places layers of "Ak" leaves (*Calotropis* spp.) are placed between the tobacco plants as it is said to improve the quality of the tobacco. The plants remain buried in the pit for about a week. During this time fermentation sets up in the leaf and the tobacco develops an agreeable aroma. After this the plants are dug out of the pit, their leaves are separated from the stalks and twisted into ropes. These ropes are then dried up in shade. This

method of curing requires a good deal of experience and judgment, because the quality of the tobacco obtained by this method depends largely on the condition of plants before burying them in the pit. If the leaves are too wet at the time of burying then they ferment too much in the pit and the quality is consequently lowered. On the other hand if the leaf is over-dried in the field, then also the cured tobacco does not possess the required quality. The chief defect in this method is that the temperature developing inside the pit is not under control.

A third method of curing practised by some growers is somewhat different from the method described above. In this method the tobacco plants after drying in the field for two or three days as described above are not buried under ground, but are heaped on the surface of the ground in two rows in such a way that their tops overlap in the centre and their butts are pointing outwards. After so arranging the plants, the whole heap is covered over with gunny so that the top plants do not get excessively desiccated. Fermentation in the heap causes the leaves to become pliant and develop an agreeable aroma. The heap is allowed to remain in this condition for about a week, after which the heap is broken and the leaves of plants are removed from the stalks and twisted into ropes. These ropes are then put in gunny bags which are placed in the sun for drying. When the ropes inside the bags appear to have been fairly dried up they are then heaped inside a room and covered over as thoroughly as possible. By doing so the tobacco is said to develop a still stronger flavour.

This method seems to have one great advantage inasmuch as the grower has control over the temperature that develops in the heap. If he at any time feels that the inside of heap is hotter than what is required for achieving the best results, he can immediately break the heap and rearrange it, so that the top plants go to the bottom. However the method suffers from the following defects:—

As the curing of tobacco crop in the Punjab falls in the hottest part of the year, the topmost layer of the heap sometimes gets over-dried and the leaves become brittle. On account of this some of the produce is wasted through crumbling of the leaves of the uppermost plants. This can, however, be remedied by applying a fine spray of water to the heap before beginning to break it. In this way the leaves absorb moisture and can be easily handled.

As the curing is done in the open, the whole produce is liable to be damaged by rain if it occurs during the curing process. However this defect can also be removed by carrying out the curing in a protected place, such as under a thatched roof. Where possible the third method should be practised inside a room and this will give the best results.

A certain amount of Virginia tobacco is now being grown in the province but as no barns are available this industry has not developed to any great extent.



It is hoped that with the building of the flue-curing barns at Lyallpur and Jullundur, this will develop in the very near future.

The United Provinces of Agra and Oudh form an important tobacco-growing area with 100,336 acres under the crop in 1934-35. The chief tobacco-growing districts in the province are: Farrukhabad, Sitapur, Jaunpur, Budaun, Mainpuri, Etah, Aligarh and Meerut.

The best quality of *Nicotiana rustica* is grown in localities where well water is brackish in the vicinity of old habitation. Nearly 80-90 per cent of the indigenous tobacco grown in these provinces is of the *N. rustica* type (*Calcuttia* tobacco) and remaining 10-20 per cent is of *N. tabacum* (*Desi*, cigarette and *bidi* tobacco). The above two types of indigenous tobacco are also called *Mahu* and *Baisakhu* according to the season in which they are grown. Tobacco can be sown at any time in these provinces after the rains begin till the middle of the cold weather the limit being fixed by the hot weather which dries up the leaf and prevents proper curing. Usually nurseries of *Mahu* are sown from August to November, transplantation is done after six weeks or two months. This crop includes both *Calcuttia* and *Desi* types. The *Baisakhu* crop is usually of the *Calcuttia* type of which the seed is sown in January and February, transplantation is done in March and April and harvesting from May to June.

The tobacco is generally ground-cured. The whole plant is cut and left in the field for drying for two days, after which leaves are separated. The leaves are again spread in the field for drying till the mid-rib becomes elastic; then it is heaped up and heaps are left in the field for another two days after which 'gaddies' (bunches) of two or three leaves are made and brought to the homestead. These 'gaddies' are heaped up and stored and turned occasionally till finally cured. In some districts leaves are not separated but the whole plant is cured and in the district of Farrukhabad the tobacco thus cured, especially that of the *Calcuttia* (*Baisakhu*) type is made into "rustica" or ropes.

The cultivation of cigarette tobacco is still in its infancy and the estimated area is about 100 acres. The varieties grown are Harrison's Special, Cash, Adcock of the Virginia exotic type and Pusa Hybrids Nos. 142 and 177. Harrison's Special is the favourite. Cigarette tobacco is chiefly grown in the district of Saharanpur as a monsoon crop. The seed is sown in the end of April or beginning of May on raised seed beds protected from hot winds. Transplantation is done in June and harvesting and curing commence in September and continue up to November. Most of the tobacco is flue-cured and is of fair quality. In the districts of Farrukhabad, Bara Banki and Jhansi cigarette tobacco is being grown on a small scale as cold weather crop. Since 1931 two cigarette factories, the United Cigarette Factory,

Allahabad, and Tobacco Manufacturers, India, Ltd., Saharanpur, have been started.

The cultivation of *bidi* tobacco is a recent introduction and is mainly confined to Gursahaiganj, Chabra, Mau Tahsil, District Farrukhabad. The acreage is estimated to be about 45 acres. The variety grown is imported from Gujarat. The seed is sown with the rains, transplantation is done from August to September and the first cutting is taken in February or March with one or two subsequent cuttings. It is ground-cured in the sun.

In Orissa, the total area under tobacco is about 14,000 acres of which about 10,000 acres are in Cuttack district, where the crop is mostly grown in the rich silted land along river banks, in the flooded tracts. Among the other districts Ganjam has about 2,000 acres under the crop and Sambalpur 1,000 acres. In the interior of the country the crop is generally grown on rich homestead lands in the villages. Both the species—*Nicotiana tabacum* and *N. rustica* are commonly grown in this province, of which the first is the main crop in the flooded tracts while on homestead lands in the inland districts both the species are indiscriminately grown.

In the flooded tracts seeds are sown in seed beds in August-September and transplanting done in October-November, after the final recession of the flood. But on homestead land seed beds are sown in July-August and the seedlings are transplanted in September-October. The newly transplanted seedlings are generally given hand irrigation for a month or so and when they are well established, flow irrigation is adopted. Flowering commences within 2½ to 3 months from the date of transplanting when the flowering shoots are nipped off leaving 8-10 leaves on a plant. The side shoots appearing at the time are scrupulously removed. The leaves begin to mature in January-February on homestead land and in February-March in the flooded tracts.

When the colour of the leaves turns yellowish brown, the crop is harvested and the cut plants are left over in the field exposed to sun for one day. They are removed to a shady place in the evening, where the leaves are separated from the stems. Five to eight leaves are then bunched together and the bunches are suspended from the ceiling on a string inside the cultivators' hut for about a fortnight. After then they are taken down and heaped up in layers in an open place not exposed to the sun, covered over with a mat or mats and weighted. They are taken out of the heaps after 4-5 days and each individual leaf is squeezed, twisted and worked with the hands and this operation is continued for 5-6 days, till the mid-rib gets dry and the leaves take the narrow form in which they come to the market. Thirty to forty such leaves are then made into a bundle and the bundles are again kept in a shady place for a few days to complete the fermentation, if not already done. This process of curing takes about two months from the